undergraduate Catalog 2006-2007

EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

Leading the World in
Aviation and Aerospace Education

DAYTONA BEACH, FLORIDA, CAMPUS
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-6000
Admissions: (386) 226-6100 or (800) 862-2416
Financial Aid: (800) 943-6279
email (Admissions): dbadmit@erau.edu

PRESCOTT, ARIZONA, CAMPUS
Embry-Riddle Aeronautical University
3700 Willow Creek Road
Prescott, AZ 86301-3720
(928) 777-3728
Admissions: (928) 777-6600 or (800) 888-3728
Financial Aid: (928) 777-3765
email (Admissions): pradmit@erau.edu

EXTENDED CAMPUS
WORLDWIDE CENTERS AND DISTANCE LEARNING PROGRAMS
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-6910 or (800) 522-6787
Admissions: (866) 509-0743
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E-mail (Admissions): ecinfo@erau.edu
http://www.embryriddle.edu/ec

http://www.erau.edu

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2006 - 2007 Calendar

Fall Semester 2006
(August 28 - December 14)

August 23-25	Orientation and Registration
August 28	Classes begin
September 4	HOLIDAY - Labor Day
October 20	University Day - Prescott
October 27	University Day - Daytona Beach
November 22-24	HOLIDAY - Thanksgiving
December 7	Last day of classes
December 8	Study Day
December 9, 11-14	Final Examinations
December 16, 17	Commencement - Daytona Beach
December 16	Commencement - Prescott

Spring Semester 2007
(January 10 - May 3)

January 8-9	Orientation and Registration
January 10	Classes begin
January 15	HOLIDAY - Martin Luther King Day
February 19	HOLIDAY - Presidents Day
March 19-23	HOLIDAY - Spring Break
April 26	Last day of classes
April 27	Study Day
April 28, 30	Final Examinations
May 1-3	Final Examinations
May 7	Commencement

Summer Semester (Term A) 2007
(May 10 - June 25)

May 8-9	Orientation and Registration
May 10	Classes begin
May 28	HOLIDAY - Memorial Day
June 21	Last day of classes
June 22	Study Day
June 23, 25	Final Examinations

Summer Semester (Term B) 2007
(June 28 - August 13)

June 26-27	Orientation and Registration
June 28	Classes begin
July 4	HOLIDAY - Independence Day
August 9	Last day of classes
August 10	Study Day
August 11, 13	Final Examinations

This catalog becomes effective July 1, 2006.

The 2006 - 2007 academic calendar applies to the Daytona Beach and Prescott campuses. Extended Campus students should contact the local Embry-Riddle center director for the academic calendar applicable to their specific location. This calendar is presently under review and is subject to change.

Orientation programs for all new Daytona Beach and Prescott students are planned, scheduled, and conducted before registration each semester. A special orientation program for new international students is held prior to the general orientation required for all new students. New students will receive special information regarding the date, time, and place of orientation activities from Admissions approximately 30 calendar days in advance of the activities.

In compliance with federal laws and regulations, Embry-Riddle Aeronautical University does not discriminate on the basis of race, color, gender, creed, national and ethnic origin, age, or disability in any of its policies, procedures, or practices. An Equal Opportunity institution, the University does not discriminate in the recruitment and admission of students, in the recruitment and employment of faculty and staff, or in the operations of any programs and activities.

Designed for use during the one-year period stated on the cover, this catalog gives a general description of Embry-Riddle Aeronautical University and provides detailed information regarding the departments in the institution and curricula offered by the University. The provisions of the catalog do not constitute a contract between the student and the University. The faculty and trustees of Embry-Riddle Aeronautical University reserve the right to change, without prior notice, any provision, offering, or requirement in the catalog. This includes the right to adjust tuition and fees, as necessary. The University further reserves the right at all times to require a student to withdraw for cause.

Official University Photography

Embry-Riddle Aeronautical University reserves the right to photograph members of the University community, including but not limited to, its students and faculty, in situations appropriate to the image of the academic institution, and to publish likenesses in Embry-Riddle Aeronautical University publications, videos, or other recruitment or promotional materials. However, the University will, to the extent feasible, honor requests of constituents who do not wish their images photographed or published.

Message from the President

To Our Students:

Thank you for choosing Embry-Riddle Aeronautical University for one of the most important investments you will make in your future. With thousands of students enrolled in our programs today, and over 60,000 alumni, you are now a member of a worldwide family of leaders in the aviation and space industry.

Our commitment is to provide you with quality programs and faculty, as well as responsive and caring student services. In reviewing this catalog, you will see a broad range of academic programs that emphasize hands-on learning. Many courses are designed as projects in which you will work with others as a team to solve real-world challenges.

As you read the history of Embry-Riddle, it will be clear that our University is evolving. In 80 years we have grown from the world's finest aviation institute to an internationally respected comprehensive university, committed to teaching, research, scholarship, and professional service to the aviation and space industry.

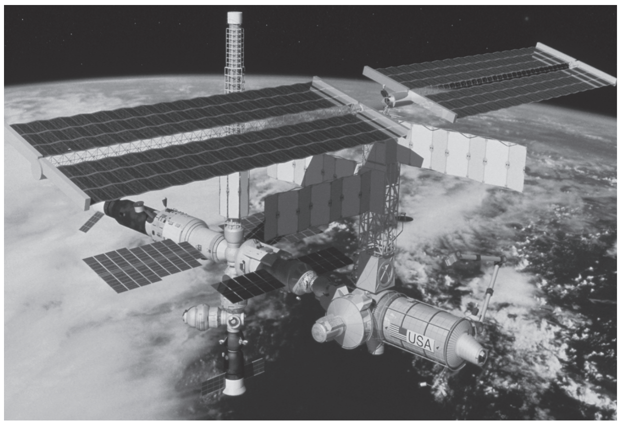
I welcome you to an exciting and dynamic University, and to the Embry-Riddle experience.

John P. Johnson, Ph.D.
Interim President

Academic Complex - Prescott Campus

Mission of the University

Embry-Riddle Aeronautical University is an independent, nonsectarian, nonprofit, coeducational university with a history dating back to the early days of aviation. The University serves culturally diverse students motivated toward careers in aviation and aerospace. Residential campuses in Daytona Beach, Florida, and Prescott, Arizona, provide education in a traditional setting, while an extensive network of Extended Campus centers throughout the United States and abroad serves civilian and military working adults.



It is the purpose of Embry-Riddle to provide a comprehensive education to prepare graduates for productive careers and responsible citizenship with special emphasis on the needs of aviation, aerospace, engineering, and related fields. To achieve this purpose, the University is dedicated to the following:

To offer undergraduate and graduate degree programs that prepare students for immediate productivity and career growth while providing a broad-based education, with emphasis on communication and analytical skills.

To emphasize academic excellence in the teaching of all courses and programs; to recruit and develop excellent faculty and staff; and to pursue research and creative activities that maintain and extend knowledge in aviation, aerospace, and related disciplines.

To develop mature, responsible graduates capable of examining, evaluating, and appreciating the economic, political, cultural, moral, and technological aspects of humankind and society, and to foster a better understanding of the workings of the free enterprise system and its social and economic benefits, and of the profit motive, as vital forces to the potential of individuals and groups.

To promote ethical and responsible behavior among its students and graduates in the local, national, and international aviation and aerospace communities and in the community at large.

To develop and effectively deliver educational programs for the adult student and professional at the undergraduate and graduate levels, including off-campus degree programs, short courses, distance learning, noncredit programs, seminars, workshops, and conferences.

To support each student's personal development by encouraging participation in programs and services that offer opportunities for enhanced physical, psychological, social, and spiritual growth; and by complementing the academic experience and contributing to the development of a well-rounded individual prepared for personal and professional success.

To engage in research, consulting services, and related activities that address the needs of aviation, aerospace, and related industries.


CAPT. WILLIE MILLER
INSTRUCTIONAL CENTER

EMBRY-RIDDLE AT A GLANCE

Aviation and Embry-Riddle: The Lifelong Partnership

At the beginning of the last century no flying schools existed, much less an aviation university. It was not until 1903 that the Wright brothers achieved sustained, controlled flight by a powered aircraft and, in so doing, changed life on this planet forever.

It did not take long for aviation to come of age. By 1914, regular passenger service had been inaugurated in Florida between St. Petersburg and Tampa. Later that year, war came to the European skies. The combined effect of military and commercial demands produced a dynamic new industry.

T. Higbee Embry

Unlike many other developments at the end of the Industrial Revolution, aviation required a special education — learning how to fly, learning about safety and weather, and learning about engines — from skilled maintenance to the outer limits of performance.

This need for trained pilots and mechanics quickly led to the establishment of a new type of school, one focused totally on aviation. In the beginning, these organizations were often a combination of airplane dealership, airmail service, flight training center, and mechanic school. The original Embry-Riddle operations fit that mold precisely.

On December 17, 1925, exactly 22 years after the historic flight of the Wright Flyer, barnstormer John Paul Riddle and entrepreneur T. Higbee Embry founded the Embry-Riddle Company at Lunken Airport in Cincinnati, Ohio. The following spring the company opened the Embry-Riddle School of Aviation, coinciding with the implementation of the Air Commerce Act of 1926, which required, for the first time, the certification and medical examination of pilots.

John Paul Riddle

Although it was a volatile time for aviation enterprises, the school prospered. Others came and went regularly, but Embry-Riddle was not affected.

Within three years the school had become a subsidiary of AVCO, the parent of American Airlines. The school remained dormant during most of the 1930s, mirroring the casualties of the Great Depression. By the end of the decade, however, World War II erupted in Europe and the demand for skilled aviators and mechanics grew significantly. Embry-Riddle's second life was about to begin.

The Lunken Airport operation had long since disappeared, but in Florida Embry-Riddle opened several flight training centers and quickly became the world's largest aviation school. Allied nations sent thousands of fledgling airmen to the Embry-Riddle centers at Carlstrom, Dorr, and Chapman airfields to become pilots, mechanics, and aviation technicians. Some 25,000 men were trained by Embry-Riddle during the war years.

After the war, under the leadership of John and Isabel McKay, Embry-Riddle expanded its international outreach while strengthening its academic programs.

Embry-Riddle at a Glance

Jack R. Hunt

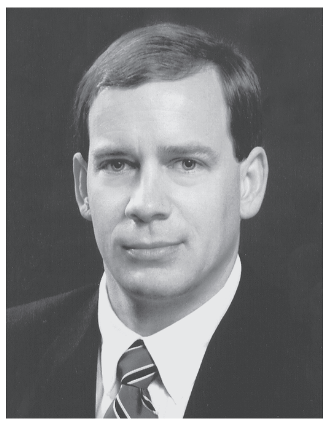
In 1965, with Jack R. Hunt as president, Embry-Riddle consolidated its flight, ground school, and technical training programs into one location. This move, which proved to be a moment of singular importance, was made possible by Daytona Beach civic leaders who donated time, money, and the use of personal vehicles. The relocation signaled the rebirth of Embry-Riddle and the start of its odyssey to world-class status in aviation higher education. In June 1970, Embry-Riddle changed its name from "Institute" to "University," and resident centers were established at U.S. military aviation centers to serve the educational needs of active-duty military personnel. Application for Southern Association of Colleges and Schools accreditation through the Commission on Colleges was initiated in 1970 and received in 1972. The University has participated in the Self-Study process ever since.

Also under President Hunt's leadership, Embry-Riddle opened a western campus in Prescott, Arizona, on the 511-acre site of a former college. With superb flying weather and expansive grounds, the Prescott campus has been an outstanding companion to the University's eastern campus.

Continuing the legacy left behind by Hunt was Lt. Gen. Kenneth L. Tallman.

Lt. Gen. Kenneth L. Tallman

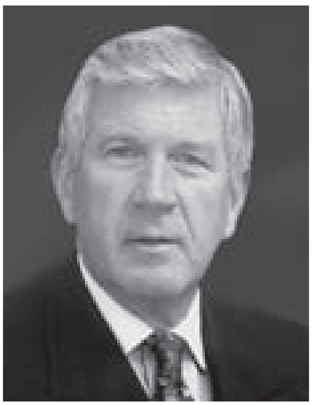
Tallman was president of Embry-Riddle for five years. He came to the University after a distinguished 35-year military career that included service as superintendent of the U.S. Air Force Academy. Under Tallman's leadership, a school of graduate studies and the electrical engineering degree program were introduced. He led the University into research with the addition of the engineering physics degree program. He also developed stronger ties between Embry-Riddle and the aviation/aerospace industry.



Steven M. Sliwa

Dr. Steven M. Sliwa led the University from 1991 through 1998. Sliwa, the University's third president, is best known for creating an entrepreneurial environment and for developing strategic partnerships with industry. These partnerships included a joint venture with

FlightSafety International; a partnership with Cessna Aircraft Company; a technology alliance with IBM; and an exclusive educational partnership with the Aircraft Owners and Pilots Association. He also spearheaded a $100+ million capital expansion program, which included an $11.5 million congressional line-item appropriation. In addition, new academic and research programs were created at his direction to respond to structural changes in the industry while increasing market share in the University's core programs.



Dr. George H. Ebbs

Embry-Riddle's fourth president, Dr. George H. Ebbs, led the University from 1998 through 2005. During his tenure the annual college guide produced by *U.S. News & World Report* consistently ranked Embry-Riddle's aerospace engineering program No. 1 in the nation among schools without doctoral programs. Embry-Riddle's programs in aerospace engineering, aeronautical science, and engineering physics are the largest in the nation.

Under the leadership of Dr. Ebbs, new graduate degree programs in safety science and space science were introduced, as well as new undergraduate degree programs in computer science, global security and intelligence studies, mechanical engineering, software engineering, and space physics. Major construction began on the Aviation Complex at the Daytona Beach Campus and the Academic Complex at the Prescott Campus.

Dr. Ebbs presided over three military contracts worth a total of more than $57 million. Under those contracts Embry-Riddle provides aviation-related degree programs to the U.S. military in Europe, trains Air Force pilots at the U.S. Air Force Academy in Colorado Springs, and trains Air Force, Air National Guard, and international flight safety officers at Kirtland Air Force Base in Albuquerque, N.M.

Accreditations and Affiliations

Embry-Riddle Aeronautical University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097, Telephone: 404-679-4501) to award degrees at the associate, bachelor, and master levels. The bachelor degree programs in Aerospace Engineering and Computer Engineering at the Daytona Beach and Prescott campuses, along with Civil Engineering, Engineering Physics, and Software Engineering at Daytona Beach, and Electrical Engineering at Prescott, are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET, 111 Market Place, Suite 1050, Baltimore, MD 21102-4012, Telephone: 410-347-7700).

Embry-Riddle at a Glance

The following bachelor degree programs are accredited by the Aviation Accreditation Board International (AABI, formerly Council on Aviation Accreditation, 3410 Skyway Drive, Auburn, AL 86830, Telephone: 334-844-2431): Aeronautical Science (Daytona Beach and Prescott), Aviation Business Administration (Daytona Beach and Prescott), Applied Meteorology (Daytona Beach and Prescott), Safety Science (Daytona Beach), and Air Traffic Management (Daytona Beach). Under the College of Aviation at Daytona Beach, the Maintenance Management area of concentration and the Aerospace Electronics area of concentration are also accredited by AABI.

The bachelor degree programs in Aviation Business Administration (Daytona Beach and Prescott) are also accredited by the Association of Collegiate Business Schools and Programs (ACBSP). The MBA in Aviation at the Daytona Beach campus is accredited by the ACBSP.

Federal Aviation Administration-approved certification programs include maintenance technology (airframe and power plant); flight (private, commercial, instrument, multi-engine, flight instructor, and instrument flight instructor ratings); and flight dispatch.

Embry-Riddle's Statement of Values

Student Success ...

We understand that students are the lifeblood of Embry-Riddle. We focus and commit ourselves and our resources to the success of current, past, and future students. Our success is gauged by the difference we make in our students' lives.

Learning Environment ...

We seek intellectual growth through study, research, questioning, listening, and debate. We value the enlightened interchange of ideas as we challenge one another to do more, to study, to learn, to share, and to grow. We expect members of the student body, faculty, and administration to exercise their academic freedoms and to preserve those of others. We commit ourselves to a lifelong endeavor of learning. We are all teachers and we are all students.

Safety ...

We care deeply about the health and safety of our students and fellow employees. We believe that each one of us, from the administration to the flight instructors, has a responsibility to make our workplaces safer for everyone. We support the open sharing of information on all safety issues and encourage all employees and students to report significant safety hazards or concerns.

Integrity, Honesty, and Trust ...

Integrity is the most valued employee trait. We believe that honesty is the foundation for interaction in all academic, administrative, and personal matters. The leadership team and each individual bear the responsibility for earning the trust of others.

Diversity ...

We respect the rights and property of all individuals regardless of gender, race, ethnicity, national origin, age, physical disability, economic background, sexual orientation, or religious belief. We believe in a community where all members are welcome, and individuals or groups are free from harassment.

Communication ...

We speak candidly and we listen well. We hold that if every involved party has taken part in a decision, then everyone will support the decision. We believe that clear and frequent communication is essential for our safety, our relationships, and our productivity.

Embry-Riddle's Statement of Values

Process and Teamwork ...

We believe that the process of collegially making decisions is usually at least as important as the quality of the decisions. We also understand and appreciate that the most successful outcomes occur when organizational units work cooperatively as a team.

Character ...

We accept responsibility for our actions. When we see a problem, we do not pass it off, we do not complain, we act. We involve others as appropriate to achieve our goals. We prize dedicated, committed, caring, conscientious, and creative individuals who strive for excellence in the performance of their duties and responsibilities.

Change and Growth ...

We appreciate that great organizations like Embry-Riddle are constantly changing, adapting to external pressures, and growing. All of our work units are constantly improving quality. We realize that our jobs require us to grow professionally and take on more responsibility. Growth requires calculated risk-taking and we empower one another to take appropriate risks and learn from our mistakes. We believe in a willingness to challenge traditions and constantly seek innovative ways to manage and solve problems.

Fiscal Soundness and Investments ...

We understand we must operate efficiently and effectively so that investments can be made in ourselves and our capabilities. We invest in technology as appropriate, principally to increase the quality and frequency of our interactions in support of our mission.

Attitude ...

We recognize, endorse, and empower leadership at all levels. We understand the joy of living in harmony with one another and strive to maintain an open, productive environment. We prize an upbeat, can-do attitude. We are members of the Embry-Riddle community because we want to be here, and this positive attitude is reflected in our communications with one another and our students.

Embry-Riddle's Employee Creed

Employee Creed

Adopted by Jack R. Hunt in 1975
Updated and reaffirmed by President George H. Ebbs, Ph.D., 2003

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A STUDENT ...
Is the most important person in this university.

A STUDENT ...
Is not an interruption of your work, but the purpose of it.

A STUDENT ...
Is not a cold statistic, but a flesh-and-blood human being with feelings and emotions like your own.

A STUDENT ...
Is not someone to argue or match wits with.

A STUDENT ...
Is a person who brings us needs - it is our job to fill those needs.

A STUDENT ...
Is deserving of the most courteous and attentive treatment we can provide.

A STUDENT ...
Is the person who makes it possible to pay your salary whether you are faculty or staff.

A STUDENT ...
Is the lifeblood of this and every university.

A STUDENT ...
Is something you once were, REMEMBER?

UNIVERSITY INFORMATION

Embry-Riddle Aeronautical University is the world's oldest and largest fully accredited university specializing in aviation and aerospace. As a global institution, the University educates more than 32,000 students annually at its residential campuses in Daytona Beach, Florida, and Prescott, Arizona, and through its Extended Campus.

The Daytona Beach campus has 4,400 undergraduate and 390 graduate students. The Prescott campus enrolls 1,700 undergraduate and 30 graduate students. The Extended Campus has 19,500 undergraduate students and 5,800 graduate students.

Our students hail from all 50 states and 93 nations. At the Prescott campus, the top five states of origin in descending order are California, Arizona, Oregon, Washington, and Texas. At the Daytona Beach campus, the top five states of origin are Florida, Pennsylvania, New York, New Jersey, and Texas. International students make up 8 percent of the student body at Daytona Beach and 3 percent at Prescott, with India at the top, followed by Korea and Japan. At the residential campuses, females constitute 17 percent of the student population.

The 185-acre Daytona Beach campus is located next to Daytona Beach International Airport. High-technology industries in the Daytona Beach and Orlando areas, as well as the Kennedy Space Center, provide the University with an outstanding support base. The campus offers state-of-the-art facilities, including the new College of Aviation building, which has air traffic control simulation and research labs and a weather center. The Lehman Engineering

and Technology Center houses the technology for distance learning, videoconferencing, decision support systems, and three-dimensional modeling. The Advanced Flight Simulation Center contains an FAA-certified Level-6 CRJ-200 simulator and Level-6 Frasca FTDs that provide a level of on-campus training unique to higher education.

The University's 539-acre western campus is located in Prescott, Arizona, 100 miles north of Phoenix. Campus facilities include the new Aerospace Experimental and Fabrication Building; the new Academic Complex; the King Engineering and Technology Center, which is electronically linked to the Daytona Beach campus; the Robertson Aviation Safety Center, which is dedicated to the study of human factors, aircraft accident investigation, and aviation safety; and the Robertson Flight Simulation Center, which contains Frasca and Airbus A320 flight-training devices. In support of academic instruction are various laboratories for engineering graphics, materials, aircraft structures and composites, and basic circuits and electronic devices, in addition to a supersonic wind tunnel and shock tube.

The Extended Campus provides educational opportunities for civilian and military professionals who are unable to attend classes at one of the University's residential campuses. Its academic programs are offered in the classroom through a network of more than 130 centers in the United States, Canada, Europe, and the Middle East and through Web-based distance learning. The Extended Campus headquarters is in Daytona Beach.

Embry-Riddle offers the student a choice of more than 30 undergraduate and graduate degree programs in aviation, aerospace, business, engineering, and related high-tech fields. U.S. News & World Report's "Best Colleges" guide ranks Embry-Riddle's aerospace engineering program No. 1 in the nation among schools without doctorate programs. Our aerospace engineering program is also the largest in the nation. The University's engineering physics program is the largest of all ABET-accredited engineering physics programs and is considered to be one of the best in the nation.

Embry-Riddle's undergraduate aeronautical science (professional pilot) program is the largest in the world; it's as large as the other top 10 U.S. collegiate flight programs combined. The program is supported by 92 instructional aircraft and 41 simulators. Embry-Riddle's precision flight teams consistently rank among the top in the nation in the SAFECON competition sponsored by the National Intercollegiate Flying Association.

While pursuing their education, our students gain valuable experience through participation in cooperative education and internship programs. More than 419 students were awarded co-op or intern positions during the 2004-2005 academic year. Students also accrue skills by assisting faculty members in conducting solution-oriented research and consulting projects for the aviation, aerospace, and other industries. In fiscal year 2004-2005, some 110 faculty members were involved in research with 123 sponsored projects. Total funding was almost $27 million.

University Information

Within one year of graduation, 95 percent of Embry-Riddle graduates are either employed or have decided to continue their education. The major airlines hire more alumni from Embry-Riddle than from any other collegiate aviation program, and Embry-Riddle is the nation's largest supplier of air traffic controllers with bachelor degrees to the FAA.

Over the decades, Embry-Riddle has educated and trained thousands of men and women of the U.S. armed forces. The two Air Force ROTC detachments at Embry-Riddle form the largest university-based Air Force commissioning source in the nation. The detachments also produce more commissioned officers and more pilots and other rated officers for the Air Force than any other institution in the nation except the Air Force Academy. The University also hosts Army and Navy ROTC units. Currently Embry-Riddle has a $30 million contract with the U.S. Department of Defense that maintains the University's long-time status as the sole provider of aviation-related degree programs to the U.S. military in Europe. Embry-Riddle also has a $14.5 million contract to train Air Force pilots at the U.S. Air Force Academy in Colorado Springs. The 50-hour flight-training program results in a private pilot's license. Under a $2.7 million contract with the U.S. Air Force, Embry-Riddle trains Air Force, Air National Guard, and international flight safety officers at Kirtland Air Force Base in Albuquerque, N.M.

As aviation and aerospace continue to evolve, so does Embry-Riddle. The University is committed to the expansion of opportunities for students to work more closely with the aviation industry in the United States and in other nations. Guiding the process of evolution are dedicated teachers, administrators, alumni, trustees, and advisory board members who share our students' love of aviation and who strive to ensure Embry-Riddle's continued position as the world's premier aviation and aerospace university.

Admission to the Residential Campuses

General Procedures

New students are eligible for admission at the beginning of the fall, spring, and summer terms. High school students may apply at the beginning of their senior year. Applications received after the priority filing dates will be processed on a space-available basis.

Term	Filing Priority	Notification	Deposit
Fall	March 1	Rolling	May 1
Spring	Nov. 1	Rolling	Nov. 1
Summer Term A	April 1	Rolling	As requested
Summer Term B	June 1	Rolling	As requested

For more information and to request an application, contact the Admissions Office at:

Embry-Riddle Aeronautical University
Director of Admissions
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-6100 or (800) 862-2416
email address: dbadmit@erau.edu
http://www.embryriddle.edu

Embry-Riddle Aeronautical University
Director of Admissions
3700 Willow Creek Road
Prescott, AZ 86301-3720
(928) 777-6600 or (800) 888-3728
email address: pradmit@erau.edu
http://www.embryriddle.edu

First-Year Applicant

The University defines a first-year candidate as one who is applying for degree status directly from high school.

The University offers admission to all applicants who present an academic record that demonstrates their ability to graduate. To reach an admissions decision, the following information is considered: overall academic performance and grades, rank in class (if available), and standardized test scores. The University's Admissions Office implements established academic policies and requirements that define the necessary qualifications for admission.

Entrance requirements to the University include: 4 years of English; 3 years minimum, 4 years preferred college preparatory mathematics; 3 years of social science; and 2 years of science including a laboratory science, 3 years preferred. Additional courses may be required depending on the major selected. Admitted students usually present more than the minimum requirements. The University reserves the right to change entrance requirements without prior notice.

Admission To The Residential Campuses

Standardized Testing

SAT I reasoning test or ACT is required for admission for U.S. citizens and permanent residents. International students, please see page 19 for further admission requirements.

English Language Proficiency

Admissions encourages all our applicants for whom English is not the primary language spoken at home to take the TOEFL exam to supplement their verbal SAT I score. This information will aid the University in accurately assessing verbal skills. For more information about testing dates and locations, contact:

TOEFL Services
Educational Testing Service
P.O. Box 6151
Princeton, NJ 08541-6151
1-609-771-7100 (worldwide)
1-877-0863-3546
http://www.toefl.org

-OR-

The College Board
5 Columbus Ave.
New York, NY 10023
(212) 713-8000

-OR-

The College Board
Box 1025
Berkeley, CA 94701
http://www.collegeboard.com

For more information, contact the Embry-Riddle Language Institute at:

Daytona Beach Campus
(386) 226-6192
fax: (386) 226-6165
email: erli@erau.edu

Transcripts

The Admissions Office accepts either an official secondary school transcript or the General Education Development Certificate (GED). An official transcript or GED score report must be sent directly from the issuing institution to Embry-Riddle.

Transfer Student Applicants

The University welcomes applicants who have demonstrated success at other institutions of higher education. For purposes of admission, a transfer student is defined as any student who has earned college credit or military credit after graduating from high school.

In making transfer admission decisions, the Admissions Office reviews official transcripts of all college-level work attempted and completed. Transfer candidates who have earned under 30 college-level credit hours are required to submit an official final high school transcript. The minimum grade point average required for admission to Embry-Riddle is a 2.00 from the last institution attended and a combined GPA of 2.00. Most successful transfer applicants present at least a 2.50 (C+) average on a four-point scale. Applicants with grade point averages between a 2.00 and a 2.40 will be reviewed on a case-by-case basis.

The University reserves the right to refuse admission to students who are on probationary status or who were academically dismissed from other colleges or universities. If the University admits such students, they will be admitted with conditional status.

Transfer Credit

1. Transfer credit may be granted under the following conditions:
   a. Appropriate coursework completed at another accredited institution with a grade of A, B, C, P, or equivalent will be accepted.
   b. Grades are not transferable. However, in instances where a student may be eligible to graduate with honors, both the grade point average of all courses taken at Embry-Riddle and the grade point average of all courses transferred from other institutions and applied to degree requirements will be taken into consideration. For details, refer to the Graduation Honors section of the catalog.
   c. Previous flight experience may be accepted in accordance with the Embry-Riddle policy as stated in the Advanced Standing section of this chapter.
   d. Credit hours are transferable if earned at institutions accredited by the appropriate regional agency. Academic credit is accepted without regard to the date the course was completed. It is left to the discretion of the student, in consultation with the student's academic advisor, to determine whether to retake the courses when placement testing indicates a deficiency. Embry-Riddle has sole discretion in determining which and how many transfer credit hours will be accepted toward degree requirements.
   e. Embry-Riddle evaluates previous academic credit on a course-by-course basis. Acceptable transfer work will be indicated on the Embry-Riddle transcript. If classes are not applicable to the student's degree program at Embry-Riddle, they will be considered as electives in excess of minimum degree requirements. The level of credit (upper or lower division) is determined by evaluation of the course at Embry-Riddle.
2. Embry-Riddle may, at its discretion, require an evaluation examination for any course submitted for transfer credit if there is doubt concerning the equivalency of the transfer course with a similar course offered at Embry-Riddle. Embry-Riddle cannot guarantee that courses are transferable. Courses are accepted at the discretion of the University.
3. The transfer student's records (transcripts and so on) will be evaluated according to the rules and regulations as described in this catalog, and in accordance with University policies in effect at the time of the student's admission to a degree program. After evaluation, the student will be sent a course-by-course outline of all transfer credit accepted by the University.

Nontraditional Student Applicants

Embry-Riddle acknowledges that full-time employment experiences often provide the motivation and discipline to be a successful

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student in college. If a student's academic career has been interrupted for a minimum of three years due to personal or financial reasons, the care of dependents, or serving time in the U.S. military, Embry-Riddle considers the student a nontraditional applicant and recognizes that his/her high school academic record may not accurately reflect the student's ability. When reviewing the student's application, unique circumstances are taken into account prior to determining whether the applicant should be a first-year or transfer student. If a GED (General Education Development Certificate) has been earned, an official copy of the results must be sent from the issuing agency. The following items must be provided by those wishing to be considered for admission:

1. Completed application form and $50 application fee (nonrefundable).
2. Official copy of high school transcript or completion of the General Education Development Test (GED scores must be sent directly by the testing agency).
3. Documentation of activities or full-time employment experience (civilian, military, or any combination equaling three years).

Returning Student Applicants

An Embry-Riddle student whose attendance at the University is interrupted may be required to apply for readmission. In such cases, a new application for admission must be filed with the Director of Admissions. For more information, refer to the Continued Enrollment section of the catalog.

Nondegree Seeking Applicants

Embry-Riddle recognizes the needs of working adults who are interested in furthering their education for retraining or for enhancing professional skills. Students who meet University admission requirements are permitted to enroll in courses as special students in a nondegree seeking status. These students are permitted to continue their enrollment as long as they maintain satisfactory academic status or until they file a formal application for admission as a degree-seeking student. Persons interested in applying as nondegree seeking students can get more information from the Director of Admissions.

International Applicants

Refers to nonresident, nonimmigrant students planning to study in the United States (typically on an F-1 or a J-1 visa.) The following items must be provided:

1. Completed application form and $50 application fee (nonrefundable).
2. Official copy of upper secondary school academic records (must be sent directly from the school to Embry-Riddle). These records must arrive in the Admissions Office in the original envelope with an unbroken seal to be considered official. Both original language documents and English translations are required.
3. Standardized Test Scores
   The SAT I: Reasoning Test or the ACT is strongly recommended for admission. Standardized test results are always reviewed in conjunction with your aca-

demic record and are never the sole factor used to determine eligibility. For information about the SAT/ACT test dates and locations please contact:

The College Board
5 Columbus Ave.
New York, NY 10023
(212) 713-8000

-OR-

The College Board
Box 1025
Berkeley, CA 94701
http://www.collegeboard.com

-OR-

ACT
500 ACT Drive
P.O. Box 168
Iowa City, IA 52243-0168
(319) 337-1270
http://www.act.org

4. TOEFL Scores
To be admitted into a degree program, international students who will not be graduating from an English educational system or for whom English is not the primary language must submit official TOEFL scores. The preferred score for admissions is a 213 (computer based) or 550 (paper based). Students scoring below the preferred score may be deferred for enrollment to our Embry-Riddle Language Institute (ERLI). Admission to ERLI does not guarantee admission to an Embry-Riddle degree program. Admissions also encourages all applicants for whom English is not the primary language spoken at home to consider taking the SAT I to supplement their TOEFL score. This additional information will aid the University in accurately assessing verbal skills. For more information about testing dates and locations contact:
TOEFL Services
Educational Testing Service
P.O. Box 6151
Princeton, NJ 08541-6151
1-609-771-7100 (worldwide)
1-877-0863-3546
http://www.toefl.org

Additional information about the Embry-Riddle Language Institute is available by contacting the program at:
Daytona Beach Campus
(386) 226-6192
fax: (386) 226-6165
email: erli@erau.edu

5. Transcripts from international postsecondary institutions. An official copy of record of study, grade obtained, examinations passed, and any diplomas, certificates, or degrees received at all secondary, postsecondary, university and professional schools attended must be sent directly to Embry-Riddle by the school. These records must arrive in the Admissions Office in the original envelope with an unbroken seal to be considered official. Both native documents and English translations are required. In addition, applicants may be required to have these transcripts evaluated by an outside evaluation service. If so required, the applicant will receive specific instructions about obtaining the evaluation during the admission process. The fee charged for this service is the responsibility of the applicant. The service provider must send the evaluation directly to Embry-Riddle. Following is a list of international

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translation and evaluation providers approved by Embry-Riddle:

American Association of Collegiate Registrars & Admissions Officers (AACRAO).
One Dupont Circle, NW
Suite #520
Washington, DC 20036-1135
(202) 296-3359
fax: (202) 872-8857

Academic Credentials Evaluation Institute Inc.
P.O. Box 6908
Beverly Hills, CA 90212
(310) 275-3530
(Request an evaluation relative to courses in the Embry-Riddle catalog.)
(This is the preferred evaluator service for the Prescott Campus.)

Educational Credential Evaluators Inc.
P.O. Box 92970
Milwaukee, WE 53202-0970
(414) 289-3400
(Request course by course evaluation.)

Foreign Credential Evaluations Inc.
1425 Market Blvd.
Suite 330
PMB #305
Roswell, GA 30338
(770) 642-1108
fax: (770) 641-8381

International Education Research Foundation Inc.
P.O. Box 66940
Los Angeles, CA 90066
(310) 258-9451
(Request a course by course evaluation.)

Josef Silny & Associates
P.O. Box 248233
Coral Gables, FL 33124
(305) 666-4133
email: info@jsilny.com
(Request course by course evaluation.)

World Education Services (WES)
P.O. Box 745, Old Chelsea Station
New York, NY 10113-0745
(800) 937-3898 -or- (212) 966-6311
fax: (212) 966-6395
email: info@wes.org
(Request course by course evaluation.)

6. I-20 Requirements for International Students. Upon application, international students must submit the following:
   a. Affidavit of Financial Support for International Students (See application booklet.)
   b. Supporting bank letter verifying appropriate funds on deposit.* This amount will reflect the amount needed to cover tuition, fees, books, health insurance, and living expenses for one year, plus $3,000 for each accompanying dependent. In the case of sponsored students, an official notification of public or private sponsorship will take the place of a bank letter. A University assistantship contract does not relieve a student from the requirement to provide both a financial affidavit and a supporting bank letter, unless waived by the appropriate University official. International students must be fully prepared upon arrival on campus to meet all normal living expenses and manage their finances for the period of time required to complete the degree.

      * See application for specific dollar amount requirement.

   c. At least 30 days prior to matriculation, students accepted for admission must submit a $200 advance tuition deposit, along with an admitted student enrollment form to confirm enrollment to the University. This form will be provided to accepted students by the Admissions Office.

The deposit will be held in the student's account for one year and will be credited toward tuition during the first semester of attendance. After one year, if a student has not matriculated, the deposit is forfeited.

The I-20 Form must be in the student's possession before departure and presented to the nearest U.S. embassy or consulate to obtain the necessary entry visa before departure to the United States.

The I-20 will be issued to student upon acceptance to the University, if all required documentation has been received.

7. Provide documentation of immunity to vaccine-preventable diseases as described in material sent from the University. At enrollment, all students from areas determined to be endemic or at high risk for tuberculosis will be required to have a tuberculosis skin test (Mantoux test) and additional medical follow-up as needed and directed by the campus Health Services Office.
8. All flight students must provide an FAA Medical Certificate, Class I or II, at least 60 calendar days before the desired enrollment date. Students who do not have access to an FAA-approved physician may take this exam after arriving in the United States.

International students desiring flight programs will be required to complete federal screening procedures where applicable.*

* Specifics will be provided during application process.

All materials submitted become the property of Embry-Riddle Aeronautical University and cannot be reproduced, returned, or forwarded.

SEVIS

SEVIS is the Student and Exchange Visitor Information System, consisting of a governmental computerized system to maintain and manage data related to foreign students and exchange visitors during their stay in the United States. This system allows for real-time access to this information and assists colleges and universities in ensuring that students comply with the terms of their visas. For more information about SEVIS, please refer to the Bureau of Immigration and Customs Enforcement (ICE) Web site at http://www.ice.gov/sevis/.

English As A Second Language —Embry-Riddle Language Institute (ERLI)

The Embry-Riddle Language Institute (ERLI) is an intensive English program providing English language instruction and cultural orientation to non-native speakers of English. Most of our students plan to attend Embry-Riddle Aeronautical University, but we also welcome others who want only to improve their English language ability. If you desire to become more proficient in listening, speaking, reading, and writing the English language, this intensive English program is for you. Students benefit from a computer laboratory with up-to-date language-learning software and TOEFL preparation software. Students who wish to attend Embry-Riddle Aeronautical University can be granted

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conditional acceptance pending completion of our program or a passing TOEFL score, assuming they meet all other University admission requirements. Eligible students are also able to earn a part-time recommendation after successful completion of a semester at ERLI, which allows them to begin their University studies while continuing their English language studies. Other benefits of our program include field trips, social events, and full access to all Embry-Riddle Aeronautical University facilities.

For more information please contact:

At the Daytona Beach Campus
Embry-Riddle Language Institute
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-6192
FAX: (386) 226-6165
email: erli@erau.edu

Admitted Student Information

Domestic students accepted for admission must submit a $200 advance tuition deposit by the stated date. This deposit confirms attendance to the University and is credited toward the first semester's tuition.

If you decide to accept our offer of admission for the fall term, you must submit the tuition deposit by the Candidates Common Reply date of May 1. Spring term deposit date is Nov. 1. Summer term deposit dates are April 1 for summer A and May 1 for summer B.

The deposit will be held in the student's account for one year should the student enroll during that year. After one year the deposit is forfeited.

A student who cancels the application at any point in the admissions process may reactivate the application without a fee for one year at any time up to the admissions deadline for the same semester of the following academic year. After one year, a new application, fee, and supporting documents must be submitted.

Advanced Standing

Advanced standing may be awarded for prior learning achieved through postsecondary education, testing, work and/or training experience, or programs completed before enrollment at Embry-Riddle. Students who feel their background warrants consideration for advanced standing not already granted for specific courses may request course equivalency examinations. Flight experience will be evaluated in accordance with procedures outlined later in this section.

It is the student's responsibility to ensure that all documentation is submitted to the University. This information can either be sent with the application for admission or mailed under separate cover. Formal application for advanced standing for flight training must be made before the end of the student's first semester of attendance at the appropriate campus.

All academic evaluations for advanced standing will be completed before the end of the student's first semester of attendance at, or readmission to, the University. The student will be given a copy of the completed official evaluation and have 30 calendar days to question the credit awarded. Advanced standing and transfer credit granted in accordance with these procedures will be authenticated by the Admissions Office and maintained by the campus Records Office. Documentation that may be submitted for consideration toward advanced standing includes military training, FAA certificates, credit for examination scores, and professional experience. Credit may be awarded as follows:

1. The University offers advanced placement credit toward a college degree to those students who present official College Entrance Examination Board (CEEB) Advanced Placement Test scores of 3 or better on any examination. Up to 30 hours of International Baccalaureate (IB) credit may be earned for official test scores of 4 or higher.
2. Embry-Riddle follows the standards recommended by the American Council on Education for awarding credit for the College Level Examination Program (CLEP) general examinations. To be officially evaluated for credit, the test scores must be submitted before the student's initial enrollment as a degree candidate. The number of credit hours recognized by Embry-Riddle for these examinations in various disciplines are as follows:

Communications	6 credit hours
Humanities	6 credit hours
Social Sciences	6 credit hours
Natural Sciences	6 credit hours
Mathematics	6 credit hours

3. The University has approved certain CLEP subject examinations, Defense Activity for Non-Traditional Educational Support (DANTES) examinations, and Excelsior College Examination (ECE) for award of credit as applicable to the student's program. Scores from these examinations must be submitted before initial enrollment as a degree candidate to be officially evaluated for credit. Credit for these examinations may not be applied toward the last 30 credit hours required for a bachelor degree or the last 15 credit hours required for an associate degree.
4. Training in military service schools will be considered for credit by each curriculum division, based on the recommendation of the American Council on Education.
5. Students who hold a pilot certificate may be eligible for advanced standing. Advanced standing based on a pilot certificate may be awarded for the appropriate flight course. A student who received college credit for their flight training may be eligible for advanced standing for certain academic courses. Contact the Aeronautical Science Department at the Daytona Beach Campus, or the Flight Department at the Prescott Campus for a determination of the exact amount of credit to be awarded. In any case, advanced standing credit must be applied for during the first semester. To obtain credit, the applicable FAA certificate must be presented at the time that the advance standing request is made. All advance standing credit for flight courses will be recorded on academic transcripts after the first flight course is completed at Embry-Riddle.

   Students holding a Commercial Pilot Certificate or Airline Transport Pilot Certificate, with significant recent experience beyond the basic certification level, may petition for additional credit. Students may be required to complete a flight evaluation or successfully complete a flight course on campus before

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becoming eligible to enroll in any off-campus Embry-Riddle affiliated airline training program. All certificate levels refer to U.S. FAA certificates. Foreign certificate holders must convert their licenses to FAA-issued certificates prior to any credit being awarded.

6. Degree programs for which holders of the FAA Airframe and Powerplant Certificate may receive advanced standing are Aviation Maintenance Science and Aeronautics.
7. The Aeronautics degree awards college credit based on an individual's past training and job experience in an aviation-related field. A description of advanced standing applicable to the Aeronautics degree may be found in the Academic Programs section of the catalog.
8. A student who possesses qualifications not listed above and who believes that his/her background warrants consideration for advanced standing may submit appropriate evidence of credentials for evaluation.

Degree Completion Program/ Active Duty Military Personnel

All branches of the armed services offer various "Bootstrap" and degree completion programs. Embry-Riddle welcomes applications from qualified military personnel seeking to participate in such programs.

Applications must be submitted by established deadlines. Upon receipt of the student's application and supporting documents, the University will evaluate previous college coursework, military education, and work experience to determine eligibility for advanced standing. Each applicant receives a copy of the University evaluation form stating specifically the courses for which credit has been given.

Immunizations

To register for classes, entering students born after Dec. 31, 1956, must submit certified proof of immunization with two doses of MMR (measles/mumps/rubella) vaccine. These immunizations must have been administered after the student's first birthday with live virus vaccines. Students living on campus must also show proof of meningitis and hepatitis B vaccinations or sign and submit a waiver to decline them. For more information, refer to the University's Medical Report Form.

FAA Medical Certificate

Each student who is accepted as a flight student must submit a copy of the FAA Medical Certificate, Class I or II, at least 60 calendar days prior to the desired enrollment date.

University Academic Regulations and Procedures

All Embry-Riddle students are responsible for knowing all academic regulations and procedures required for continued attendance at the University. Academic regulations and procedures are presented in University publications such as this catalog, the Student Handbook, the Flight Operations Manual, the Residence Hall Regulations pamphlet, the Curriculum Manual, and the Academic Policies and Procedures Manual. These documents are available for reference at campus records offices, student government offices, and academic departments throughout the University. A student who requires clarification of any policy or regulation should seek help from his/her academic advisor, program coordinator, or the appropriate office of Records and Registration. University regulations will not be waived because a student pleads ignorance of established policies and procedures.

The University reserves the right to change curricula and academic regulations and procedures without notice or obligation. Such changes are published in an addendum or in the next catalog.

Students should consult the graduate catalog for academic policies and regulations for graduate programs.

Academic Advising

At the residential campuses, each new student is assigned an academic advisor. Academic advisors help students choose and schedule academic programs that meet their educational goals.

Academic advisors post their scheduled office hours and students should call on them frequently and whenever assistance is needed.

Schedule of Classes and Registration

Students are required to register for each term of enrollment. At all locations students will be allowed to register via Web registration. However, at the Daytona Beach campus, first-year students and students in academic difficulty will be denied access to Web registration. They must see their academic advisor for approval of course selection prior to registration. At the Prescott campus, first-year students and students in academic difficulty must see their advisor, who will release their hold, allowing them to register on the Web. Registration must be completed and payment of all tuition deposits and fees must be made according to instructions published by the campus Records Office. Students are not officially enrolled until they complete all phases of registration, including financial requirements.

Penalties will be charged for late payment of fees. Late registration will be allowed during the first five days for the Daytona Beach and Prescott campuses if unusual circumstances prevent the student from registering during the scheduled period. Except for flight courses, registration will not be allowed after the last day of late registration. Special circumstances can be appealed through the dean of the college. Due to the scheduling requirements associated with flight training, flight course registration continues throughout the term.

University Academic Regulations and Procedures

A schedule of classes is prepared for each term at all locations served by the University. The University reserves the right to make necessary and appropriate adjustments to the published schedule to include cancellation or rescheduling of any class.

Class Attendance

Because regular attendance and punctuality are expected in all courses, attendance may be included in the grading criteria of an individual class. Absences are counted from the first scheduled meeting of the class.

Because minimum contact hour requirements have been imposed by the FAA for certain classes leading to FAA certificates, attendance requirements in those courses are rigorously enforced. Explanations for all absences should be given to the instructor in advance whenever possible.

A final examination is normally given in each course at the end of the term. A student who misses a final examination without advance permission from the instructor may be assigned a failing grade (F) for the course. A grade of incomplete (I) may be given if the student has obtained advance permission from the instructor or can provide satisfactory evidence that the absence could not be prevented.

Academic Integrity/Conduct

Embry-Riddle is committed to maintaining and upholding intellectual integrity. All students, faculty, and staff have obligations to prevent violations of academic integrity and take corrective action when they occur. The adjudication process will include the sanction imposed on students who commit the following academic violations, which may include a failing grade on the assignment, a failing grade for the course, suspension, or dismissal from the University:

1. Plagiarism: Presenting as one's own the ideas, words, or products of another. Plagiarism includes use of any source to complete academic assignments without proper acknowledgment of the source.
2. Cheating is a broad term that includes the following:
   a. Giving or receiving help from unauthorized persons or materials during examinations.
   b. The unauthorized communication of examination questions prior to, during, or following administration of the examination.
   c. Collaboration on examinations or assignments expected to be individual work.
   d. Fraud and deceit, which include knowingly furnishing false or misleading information or failing to furnish appropriate information when requested, such as when applying for admission to the University.

Students exhibiting the following undesirable acts of conduct may be suspended or dismissed from the University. Criminal acts must be reported to the appropriate law enforcement and University authorities.

1. Unauthorized alteration or misuse of one's own or another's academic records or transcripts.
2. Forging, altering, falsifying, destroying, or unauthorized use of a University document, record, or identification. This includes using the logo, stationery, or business cards of the University or oth-

erwise identifying oneself as an agent of the University for personal, non-University business.

3. Misuse of computing facilities and/or security violations, including attempted violations of computing facilities.
4. Conduct that disrupts the educational process of the University.

Unit of Credit

Semester credits are used throughout the University system. Transferred quarter hours will be converted to semester credit hours on the following basis: A quarter hour equals two-thirds of a semester hour.

Course Load Status

For residential campus students, 12 credit hours constitute the minimum load for full-time student status during the fall and spring terms. The minimum load for full-time student status during each summer term is 6 credit hours. Students enrolled in fewer credits than the minimum full-time load are classified as part-time. All audited courses and courses taken for credit are counted in determining the student's load for a term.

The normal maximum load is 18 hours during spring and fall terms or 9 hours during summer terms. At all University locations, a student whose cumulative grade point average (GPA) is 3.00 or higher may register for an overload with advance approval of the appropriate program coordinator/chair.

Classification of Students

Students are classified at the end of each term based on the total number of credit hours earned in accordance with the following schedule:

First-Year:	fewer than 28 hours
Sophomore:	28-57 hours
Junior:	58-87 hours
Senior:	88 hours or more

Grading System

The following indicators, used on grade reports and transcripts, signify the quality of a student's academic performance.

LETTER GRADE	STUDENT PERFORMANCE	GRADE POINTS PER CREDIT HOUR
A	Superior	4
B	Above average	3
C	Average	2
D	Below average	1
F	Failure	0
WF	Withdrawal from the University-failing	0
W	Withdrawal from a course	N/A
AU	Audit	N/A
I	Passing but incomplete	N/A
IP	In progress	N/A
P	Passing grade (credit)	N/A
S	Satisfactory (noncredit)	N/A
T	Transfer credit	N/A
N	No grade submitted by instructor	N/A
X	Credit by means other than course equivalency examinations	N/A
XP	Credit by course equivalency exam	N/A

University Academic Regulations and Procedures

Grade Reports

Final grades are issued at the end of each term. Students can access their grades immediately after they are posted, via Student Online Services. At the residential campuses, grade mailers will be mailed only to those students who have specifically requested a hard-copy grade report and supplied a "grades address" to the Records and Registration Office.

The University is prohibited from releasing grade information without the express written authorization of the student. Such authorization must be granted each term because blanket authorizations are prohibited by law.

Grade Point Averages: GPA, CGPA

A term grade point average (GPA) and cumulative grade point average (CGPA) are computed for each student after every term. The GPA is calculated by dividing the number of grade points earned during the term by the number of hours attempted in that period. The CGPA is determined by dividing the total number of grade points by the total number of hours attempted at the University. Grade points and hours attempted are accrued in courses graded A, B, C, D, F, and WF only.

Dropping a Course

Students may drop a course, with no notation of course enrollment on their transcripts, during the drop period only. The drop period extends through the third week of spring and fall terms and the second week of summer terms for residential campus students.

Auditing a Course (AU)

Because students audit a course solely to enhance their knowledge, academic credit is not granted toward degree requirements for audited courses. Students may change their registration from audit to credit during the add period only. They may change from credit to audit until the last day of the withdrawal period. When a student auditing a course fails to maintain satisfactory attendance, as determined by the instructor, a grade of W will be assigned.

Withdrawing from a Course (W)

Residential campus students receive the grade W if they withdraw from a course by the end of the 10th week of spring and fall terms and the fifth week of summer terms. If they withdraw from a course after this period, they receive an F. If students stop attending their classes and fail to withdraw from the University, an F is assigned for each course in which they were enrolled.

Students may not drop or withdraw from a basic skills course without written permission from the chair of the department offering the course.

Students are not permitted to drop or withdraw from a course while a charge of academic dishonesty is pending. Students who withdraw from a flight course before their initial attempt at the final phase check receive a W.

Incomplete Grades (I)

In exceptional cases, faculty may assign the temporary grade of incomplete (I) if a student is unable to complete the required work in a course because of medical emergency, death in the family, military duty, or other extenuating circumstances. If a student does not complete the course within the specified period of the following term, the grade I automatically converts to an F.

For residential campus students, the period to convert an I extends through the sixth week of subsequent spring and fall terms or the third week of subsequent summer terms.

Incomplete Flight Courses (IP)

Because the length of time required to complete flight courses varies and may not coincide with the end of the academic term, the temporary grade IP is assigned for flight courses in which students are still active. If the course is not subsequently completed the following term or extended further by the department chair, the grade IP automatically converts to an F.

Flight students may receive an F for excessive unexcused no-shows.

Repeating a Course

With the exception of flight courses, which may be repeated only once, a student may repeat any University course. The grade for each attempt will appear on the student's permanent academic record. In determining the student's CGPA, the grade for subsequent attempts at a course replaces the previous grade a maximum of two times.

Course Equivalency Exams

Students who believe they possess sufficient knowledge and who have not previously failed that particular course may apply to take the course equivalency examination for a limited number of courses. At the residential campuses, course equivalency examinations must be completed prior to the time the student reaches the last 30 credits for a bachelor degree.

A nonrefundable fee is charged for administering each equivalency exam. Because students may take a course equivalency exam only once for each course, those failing a course equivalency examination must enroll in and complete the course to receive credit. Residential campus students submit their applications to the chair of the academic department offering the course.

Dean's List and Honor Roll

Students who have demonstrated academic excellence during a term are notified in writing by the appropriate campus Records and Registration Office. Additionally, a notation is placed on the academic transcript. To be eligible for term honors, students must have maintained at least a 2.00 CGPA and must not have received a D or F during the term. In addition, students must have achieved a term GPA of 3.50-4.00 for inclusion on the Dean's List or 3.20-3.49 for inclusion on the Honor Roll. A term is defined as one term (full-time status) at the residential campuses.

University Academic Regulations and Procedures

Academic Warning, Probation, Suspension, and Dismissal

Warning

A student whose cumulative grade point average (CGPA) is less than 2.00 for one term is placed on academic warning.

Probation

A student whose CGPA is less than 2.00 for two consecutive terms is placed on academic probation. Students on probation are classified as students not in good standing and may not serve as elected members of the Student Government Association, may not participate in intercollegiate athletics as members of a University team, may not serve on the editorial staff of a campus publication or work on campus, and will lose eligibility for financial aid programs. The academic programs of students on warning or probation may be restricted. A student who has a term GPA of less than 1.00 may also be placed on academic probation or suspension in accordance with University academic policies.

Suspension

A student whose CGPA is less than 2.00 for three consecutive terms, or a student on academic probation whose CGPA at the end of the subsequent period is below 2.00, is suspended from the University unless the student maintains a term GPA greater than 2.00.

A student who has a term GPA of less than 1.00 may be suspended or placed on academic probation.

Dismissal

A student who has been suspended and readmitted is on probationary status until the CGPA has been raised to 2.00. If the term GPA falls below 2.00 during the probationary period, the student is dismissed. Any previously suspended student who has been restored to good standing but whose academic performance subsequently deteriorates to a level that would qualify for initial suspension is dismissed. Academic dismissal is final and the student will not be readmitted to the University.

When a change of grade or the conversion of the grade I changes a student's academic status, the previous academic status of warning, probation, or suspension is removed and does not become part of the student's permanent record.

Suspension and Dismissal for Cause

The University reserves the right to suspend or dismiss a student at any time and without further reason, if the student exhibits the following undesirable conduct:

1. Actions that pose a risk to the health, safety, or property of members of the University community, including, but not limited to, other students, faculty, staff, administrative officers, or the student himself/herself;
2. Conduct that disrupts the educational process of the University;
3. Any other just cause.

Readmission

A student who has been suspended from the University for any reason must apply for readmission with the same campus to the Records and Registration Office at Daytona Beach and the director of Admissions at Prescott.

A student who has been academically suspended may apply for readmission after 12 calendar months following the suspension or after completing a minimum of 15 hours of academic credit with a CGPA of 2.50 or higher from an accredited institution. If the University readmits such students, they will be admitted with probationary status.

Areas of Concentration and Minor Courses of Study

Areas of concentration give students specialized preparation in a degree program. Minor courses of study are coherent academic programs designed to satisfy students' personal interests and to meet their professional needs. Students may consult with their program chairs or coordinators if assistance is needed in choosing areas of concentration or minors. Once a decision is reached, students who wish to declare an area of concentration or minor should contact Records and Registration. Some minor courses of study are not open to students pursuing particular degree programs. A minor must be in a discipline outside the student's major field of study.

The student becomes subject to the requirements of the minor as stated in the catalog in effect at the time of matriculation or the current catalog in effect at the time the minor is declared. The department/program chair responsible for a particular minor determines how students fulfill deficits in credits for a minor and certifies that students are qualified to receive the minor.

Areas of concentration and minor courses of study are posted on the student's academic transcript at the time the student graduates with a baccalaureate degree.

Change of Degree Program

Students may apply to change their degree programs if they meet academic qualifications and if the degree program is not at capacity. Students should contact their current program coordinator to initiate the application.

When a student elects to change degree programs, areas of concentration, or major within a degree program, the requirements of the catalog in effect at the time the request was approved apply, with certain exceptions. Students considering such changes should contact their academic advisor or department chair to determine how they will be affected.

Two Degrees of the Same Rank

To earn a second baccalaureate degree, students must complete a minimum of 30 credit hours of coursework over and above that required for the declared primary degree. At least 60 credit hours must be completed in residence at the University and at least 20 of the 30 additional credit hours must be 300-400 level courses.

To earn a second associate degree, students must complete at least 15 credit hours of coursework over and above that required

University Academic Regulations and Procedures

for the primary degree. At least 30 credit hours must be completed in residence.

Continuous Enrollment

Students are considered to be continuously enrolled, regardless of the number of hours for which they register, unless they:

1. Enroll at another institution without advance written approval.
2. Fail to enroll in at least one course at Embry-Riddle in any two calendar year period.
3. Have been suspended or dismissed from the University.

Students failing to maintain continuous enrollment for any reason are required to reapply for admission under the catalog in effect at that time.

Catalog Applicability

The catalog in effect at the time of a student's initial matriculation remains applicable as long as the student remains in the original degree program, major, or area of concentration.

If a student does not maintain continuous enrollment at the University, the student must apply for readmission. The provisions of the catalog in effect at the time of readmission then become applicable to the student.

Curricular requirements stated in the applicable catalog will not be affected by subsequently published addenda to that catalog or by later catalogs unless the student elects to graduate under the provisions of a later catalog or addendum. Students electing to graduate under the provisions of a later catalog or addendum must meet all requirements (admission, transfer, graduation, and so on) contained in that catalog or addendum.

Attendance at other Institutions

Once admitted to the University as degree candidates, students are expected to complete all work to be applied toward their degrees with the University unless advance written authorization is granted.

Residential campus students in good academic standing must petition to receive credit for courses or training, including flight instruction, outside the University while maintaining enrollment at Embry-Riddle. To initiate this procedure, students must process a Petition To Take Courses at Another Institution. If Records and Registration has no formal documentation of course equivalency, students must provide adequate evidence to the course-specific department chair that the petitioned courses are equivalent to Embry-Riddle courses or are acceptable as elective credit in their degree program. After the courses are deemed equivalent, the student's program coordinator evaluates the petition, considering such factors as the reasons for petitioning and the availability of the courses in the University curriculum.

Residential campus students may not co-enroll at a local institution. When not enrolled at Embry-Riddle, students who are local residents must follow normal petition procedures to enroll in courses at another local institution. For the Daytona Beach campus, a local resident constitutes a student who attended a high school in Volusia County or a student who resided in Volusia County prior to initial matriculation. For the

Prescott campus, a local resident is a student who attended a high school in Yavapai County or a student who resided in Yavapai County prior to initial matriculation. Under certain circumstances, students may be permitted to take courses in ethnic studies or foreign languages as electives at a local institution.

After initial matriculation, Daytona Beach and Prescott students may not earn more than a total of 18 semester hours or that equivalent at another institution.

Flight Course Related Information

All flight training at Embry-Riddle is done in late-model, fully equipped aircraft. In addition, procedures trainers and flight-training devices give the student a safe, flexible, and cost-effective training environment. The Daytona Beach campus uses the Gemini Flight concept, whereby two students fly together along with their instructor as a team. This gives the student additional exposure to flight training at no additional cost. The flight-training program operates under all applicable FAA rules, regulations, and requirements. The student is responsible for adhering to those rules, regulations, and requirements, which are contained in the Embry-Riddle Flight Operations Manual and local campus bulletins.

While flight training is an integral part of the Aeronautical Science program, it is also contained in other degree programs, either as an area of concentration, minor course of study, or as elective credit on a space-available basis. Students should investigate the applicability of certain courses to their program along with the necessary prerequisite/corequisite course requirements prior to making any commitment and investment.

Flight Course Scheduling

Students usually begin their initial flight course sometime during their first year in attendance. The exact start date depends on the academic preparation of the student, student desire, weather conditions, and aircraft and instructor availability. The length of time required to complete a course will also vary based on these same factors. All flight-training courses may begin and end at any time during the academic year and may not coincide with the beginning and ending dates of the published semester schedule. Therefore, students who begin a flight course late in the semester should be prepared for training in that course to continue into the next semester.

Flight courses require a minimum block of time and may include flying on weekends. Study, preparation, and some flight lessons may require time outside this block. Students, particularly beginning students, are cautioned not to overload their course schedules when taking a flight course.

See the University Academic Regulations and Procedures section of this catalog for additional information about University policies on flight courses. The Embry-Riddle Flight Operations Manual also contains information on flightline policies and procedures.

University Academic Regulations and Procedures

Credit For Flight Training at Other Institutions

All students desiring to complete off-campus flight training for credit after matriculation must be approved in writing in advance by the Flight Department. The credit that will be awarded (advance standing) and the procedures for requesting credit when training is completed will be specified in the written approval (Off Campus Authorization Form). The following general rules apply as specified under each heading. Please address any questions to the Flight Department.

BS in Aeronautical Science

The Aeronautical Science (AS) degree is accredited by the Aviation Accreditation Board International (AABI) and is governed by the following criteria. Aeronautical Science students will be awarded credit for FAA certificates held prior to matriculation to Embry-Riddle, and may be approved to complete one certificate or rating if flight training from an appropriately rated instructor was logged prior to matriculation. If FAA certificates are held, this training must have occurred after the attainment of the most recent certificate for which credit is granted. Except as provided above, after a student matriculates all flight training must be completed at Embry-Riddle or approved at another CAA flight education accredited college or university. In all cases, students must satisfactorily complete at least one flight course on campus after advance standing is awarded or CAA-approved courses are transferred.

Flight Minors or Areas of Concentration

Individuals pursuing areas of concentration and minor courses of study that require a flight (FA) course must satisfactorily complete at least one FA course on campus after completion of the approved off-campus flight training. If students declare a change of program to the B.S. in Aeronautical Science degree, the advanced standing credit for flight training after matriculation may not transfer.

Open Elective Credit

Students who are not pursuing the B.S. in Aeronautical Science degree, Flight minor, or AOCs requiring FA courses, and who desire to complete off-campus flight training for credit after matriculation must receive approval by the Flight Department in writing and in advance of the anticipated training. If students declare a change of program to the B.S. in Aeronautical Science degree, the advanced standing credit for flight training after matriculation may not transfer. Transferring to a Flight minor or Area of Concentration would necessitate satisfactorily completing at least one FA course on campus after the awarding of transfer credit and advance standing.

Awarding Advance Standing

Upon completion of the approved flight training, all students must show their copy of the approved Off Campus Training Authorization Request Form, in addition to the appropriate documents of their training, to the Flight Department. Approved advanced standing credit will be applied to the student's transcript. See above restrictions regarding change of programs, AOC, and minor courses of study.

Aviation and Transportation Security Act

The Aviation and Transportation Security Act (ATSA) requires students registered for Flight (FA) courses to show acceptable documentation of U.S. citizenship OR to complete background check requirements.

Students enrolled in an FA course must present ONE of the following to the Embry-Riddle Records Office prior to being allowed to start flight training:

1. A valid, unexpired U.S. passport
2. An original birth certificate with raised seal documenting birth in the United States or one of its territories
3. An original U.S. naturalization certificate with raised seal, Form N-550 or Form N-570
4. An original certification of birth abroad, Form FS-545 or Form DS-1350

   -OR-

   An original certificate of U.S. citizenship, Form N-560 or Form N-561

If using other than a valid passport, a valid driver license with a photo or government-issued photo ID will also be required. Photocopies of the above are not acceptable, even certified copies. This process needs to be completed only one time for the entire curriculum at Embry-Riddle.

Those unable to complete the above requirements, including international and permanent resident alien students, will be able to register for FA courses but must comply with U.S. Department of Homeland Security (DHS) notification requirements. Before receiving any flight training, they must provide DHS through the Transportation Security Administration (TSA) a set of fingerprints, a photo, a processing fee, and must register online. Once the student is registered and the items are sent to the TSA, the student may begin training, if there is no direction otherwise. Some advanced flight courses may require a waiting period of up to 30 days. If Embry-Riddle receives any directive from the DHS or TSA, the student may be administratively withdrawn as appropriate to the DHS or TSA directive. This information and fee, but not the fingerprints, must be sent periodically during flight training and will be coordinated through Embry-Riddle's International Students Office. Please contact the Aeronautical Science Department at the Daytona Beach campus, or the Flight Department at the Prescott campus for more information.

Withdrawal from the University

Residential campus students who leave the University for any reason must conduct an exit interview at the Student Success Center and officially process a withdrawal clearance through the Records and Registration Office. When a student withdraws from the University after the end of the scheduled withdrawal period, a WF grade will be assigned for all courses in which the student is enrolled unless an exception is granted for medical reasons or other extenuating circumstances.

University Academic Regulations and Procedures

Graduation Requirements

Students must complete the general graduation requirements as prescribed by the University, as well as all degree requirements specified in the degree being pursued. The following summary of graduation requirements is provided for all students:

1. Students must initiate an application for graduation. The application must be received by the Records Office within the time limit established by that office.
2. Students must successfully complete all required courses for a particular degree listed in the applicable catalog.
3. Students must successfully complete the minimum number of credit hours required for the degree as listed in the applicable catalog.
4. Residential campus students pursuing a bachelor degree must complete the last 30 credit hours at the University.
5. Students pursuing a baccalaureate degree must complete a minimum of 40 credit hours in upper-division (300 and 400 level) courses. Credit transferred from other institutions will be accepted at the discretion of Embry-Riddle. Exceptions to the 40-hour upper-division requirement are authorized only when the specified required courses preclude achievement in the minimum credit hour requirements in the catalog listing for the degree. In such cases, all electives taken must be upper-level.
6. For degree completion, at least 25 percent of semester credit hours must be earned through Embry-Riddle instruction.
7. Students pursuing any undergraduate degree must earn a minimum cumulative grade point average (CGPA) of 2.00 for all work completed at the University. Candidates for the B.S. in Aerospace Engineering, B.S. in Civil Engineering, B.S. in Computer Engineering (B.S. in Computer Engineering and Software Engineering candidates must also earn a minimum CGPA of 2.00 in all AE, EE, ES, ET, SE, and CEC courses that fulfill any of the degree requirements), B.S. in Electrical Engineering, and the B.S. in Engineering Physics must also earn a minimum CGPA of 2.00 in all required core courses. Details are specified under the degree requirement headings of the Academic Programs section in this catalog.
8. Students will not be issued a diploma or transcript of their records until all debts or obligations owed to the University have been satisfied.
9. Students will not be issued a diploma unless their behavior is in good standing, according to University policies and regulations. This includes, but is not limited to, not being on disciplinary probation.
10. Students will not be permitted to participate in formal graduation ceremonies conducted at the residential campuses until all the degree requirements listed above have been satisfied.
11. In the event that a graduating student does not attend a scheduled graduation exercise, the diploma is mailed to the address provided by the student.

Graduation Honors

Graduation honors recognize students who have demonstrated excellent performance throughout their academic careers. They are only awarded to students who complete baccalaureate degree programs. To be eligible, the student must have completed at least 45 credit hours in residence at Embry-Riddle. The level of graduation honors will be based on the cumulative grade point average for all courses taken at Embry-Riddle and those courses transferred from other accredited institutions that are directly applicable to the student's degree program. The honors level will appear on the student's academic transcript with the degree information.

Graduation honors (baccalaureate only) will be awarded in accordance with the following criteria:

Honors Level	CGPA
Summa Cum Laude	At least 3.90
Magna Cum Laude	At least 3.70 and less than 3.90
Cum Laude	At least 3.50 and less than 3.70

To be recognized for honors at the formal commencement ceremonies held at the Daytona Beach and Prescott campuses, all degree requirements must be met.

Transcript Requests

A signed request for an academic transcript, accompanied by a fee, may be submitted by the student to the appropriate Records and Registration Office. Transcripts will not be released to students who have failed to meet their financial obligations to the University.

Privacy of Student Records

The University respects the rights and privacy of students in accordance with the Family Educational Rights and Privacy Act (FERPA). At its discretion, the University may disclose certain items of directory information without the consent of the student, unless the student submits a written nondisclosure request. Students are required to file a request for nondisclosure on an annual basis. Directory information consists of student name, address, telephone number, date and place of birth, major fields of study, dates of attendance, degrees and awards received, most recent previous school attended, photograph, and e-mail address.

The University will obtain written consent from students before disclosing any personally identifiable information from their education records with the exception of the directory information. The receipt of a written request to release an education record via fax satisfies this requirement. Such written consent must specify:

1. The records to be released.
2. The purpose of the disclosure.
3. Identify the party or class of parties to whom disclosure may be made and their address.
4. When transcripts are to be sent by fax, the written request must contain the telephone fax number where the transcript is to be sent. Generally, transcripts should be faxed only if an urgency

exists. A faxed transcript may be considered official by the recipient, subject to their policies, security measures, and validation procedures. In addition to the faxed transcript, an official validated transcript will be mailed directly to the recipient.

e. Must be signed and dated by the student or former student.

The law gives students and former students the right to inspect and review information contained in their education records. The student must submit a written request to the appropriate Records and Registration Office. The appropriate Records and Registration Office must make the records available for inspection and review within 45 days of the request.

FERPA allows disclosure of educational records or their components under certain conditions. Students desiring additional information on FERPA may contact the Records and Registration or Student Services Offices.

Mandatory Student Drug Testing

Success in the aviation industry requires a commitment to excel and the discipline to avoid unsafe practices. The use of illegal drugs constitutes an unsafe practice and is incompatible with an aviation environment. Therefore, the University reserves the right to immediately suspend or dismiss any student who uses or possesses illegal drugs. In the effort to maintain a work and educational environment that is safe for its employees and students, the University has established a mandatory student drug testing program.

Scope

The drug testing program applies to all students who engage in flight training at the University.

The University tests for marijuana, cocaine, opiates, amphetamines, and phencyclidine (PCP) as follows:

1. Random testing of students engaged in flight training.
2. Required postaccident testing for students involved in an aircraft accident. Students are tested for drugs within 32 hours after an accident. An accident is defined as any occurrence associated with the operation of an aircraft that results in any person suffering death or serious injury, or where the aircraft receives substantial damage as determined by the National Transportation Safety Board. The accident can occur at any point between the time a person boards the aircraft with the intention of flight and the time all have disembarked. In the event that drug testing is required, students who fail to comply with testing procedures, refuse to be tested, or test positive for illegal drugs are subject to the following actions:

1. Students who fail to comply with all University directives concerning the place of testing, the manner in which they are to arrive at the test site, and any other related matters are subject to disciplinary action up to and including dismissal from the University.
2. Students who refuse to be tested after being requested to do so by the University will be dismissed from the flight program and possibly the University.

3. Students whose test results show positive for the use of an illegal or nonprescribed drug, as verified by a medical review officer, will result in dismissal from the Flight program and up to and including dismissal from the University.

Testing

The cost of drug testing is the responsibility of the University. Embry-Riddle has contracted with a professional testing service as the certified laboratory for the collection and analysis of test specimens. This testing service will adhere to all requirements for chain of custody, test reporting, and specimen retention in accordance with proposed DOT and FAA regulations.

Notification

Students applying to attend the residential campuses are notified of the drug testing requirement through various University publications. The drug testing policy is also explained on appropriate flight course registration forms.

Student Education and Assistance

Embry-Riddle promotes substance abuse awareness by sponsoring educational programs and distributing literature. The University is additionally committed to assisting students in the resolution of problems associated with substance abuse and encourages students to seek additional help through referrals from the University Health Services and Counseling Offices.

University Financial Information

Student Accounts

At the time of acceptance for admission, a University account is opened for each student. This account remains open until graduation. The primary use of this account is for University charges and payments. If an account shows credit balances, a student may request a refund in the form of cash or a check. Each student is encouraged to open and maintain an account at a local bank for personal matters.

Billing Address

Residential campus students are assigned an Embry-Riddle email address, which is their primary address for all University correspondence. However, all financial statements can be sent to any address designated by the student. Billing-address change forms are available through the Web site http://www.erau.edu.

All student account information may be obtained on Embry Riddle's Web site. A PIN (issued at Student Orientation) is required to access any student's academic or financial information.

Payment Procedures

Cash, Visa, MasterCard, Discover, AMEX, and personal checks are acceptable forms of payment. Payments made by mail should be addressed to the campus Cashier Office and timed to arrive prior to the first day of class. Charges incurred subsequent to registration are due 30 days from the date of invoice or the last day of class, whichever occurs first. All payments should include the student's name and identification number.

Bills for tuition and fees, issued at the end of registration, are payable on the first day of class. If full payment cannot be made by this date, tuition-payment agreements on outstanding balances are available. There will be fees incurred for deferring payment. Fees may vary depending on the campus attended.

When a student's account is delinquent, registration for that term is subject to cancellation and registration for any subsequent semester will be denied. A delinquent student account will result in suspension of all academic processing and information on class performance, grades, and transcripts will be withheld. Continued delinquency may result in administrative withdrawal from the University. Administrative withdrawal will not relieve a student of the obligation to pay outstanding debts. Sums remaining unpaid will be charged interest at the maximum rate allowed by law. The student is also subject to the costs of collection, including collection agency fees and reasonable attorney's fees for making such collection. Delinquent accounts may be reported to one or all three major credit bureaus.

Books, Supplies, and Tools

Purchases are made directly from the University Bookstore. Cash, checks, Eagle Dollars, Visa, MasterCard, and AMEX are accepted. Students whose estimated financial aid is higher than the total amount for tuition and fees may request these funds from the Bursar Office for book purchases.

Delinquent Accounts

When a student's account is delinquent, registration for that term is subject to cancellation and registration for any subsequent semester will be denied. A delinquent student account will result in suspension of all academic processing and information on class performance, grades, and transcripts will be withheld. Continued delinquency may result in administrative withdrawal from the University. Administrative withdrawal will not relieve a student of the obligation to pay outstanding debts. Sums remaining unpaid will be charged interest at the maximum rate allowed by law. The student is also subject to the costs of collection, including collection-agency fees and reasonable attorney's fees for making such collection. Delinquent accounts may be reported to one or all three major credit bureaus.

Residential Campus Tuition and Fees

Fall 2006/Spring 2007 Tuition

Students registering for coursework during the spring or fall term totaling 12-16 credit hours are billed according to a "block tuition" rate. Registration for coursework equaling 1-11 credit hours is charged on a per-credit-hour basis. Students whose undergraduate course loads during fall or spring semesters are greater than 16 hours are charged the semester rate plus a per-credit-hour charge for those credit hours over 16.

Courses taken in the Aviation Maintenance Science Department (AMS courses) are billed separately from other academic courses, and have a lower per credit-hour tuition rate. AMS courses do not fall under the "block tuition" rate.

Summer tuition rates are determined solely by the number of credit hours per term. Each summer term is billed separately.

Detailed tuition rates are described in the 2006/2007 financial insert at: http://www.erau.edu/er/costs.html.

Hourly Flight Rates

Rates vary by type of aircraft or simulator. Please see the financial insert applicable to your campus for specific rates.

Payment for Flight Instruction

The University uses a cash-basis payment method for all flight instruction. Payment is expected at the completion of each training session.

The following is a description of the flight-payment process.

After completing the training session, you will proceed to the Flight Operations Payment Station. A flight ticket will be presented to you indicating the type of instruction and the number of hours you just received. Your signature and the instructor's signature will be required to validate this instruction. Charges for that session will be calculated and payment will be collected using your credit card, Eagle Card, or personal check. Your payment will be processed and you will be given a receipt.

If your method of payment cannot be processed for whatever reason, the training session will be charged to your student account. A hold will be placed on your flight account until this transaction is paid. Any further instruction, not already scheduled, will be suspended until payment is received.

Financial Assistance

If you do not wish to use a credit card or do not have one, Eagle Dollars or checks give you other options. Any combination of these payment methods may be used at any time.

Room and Board

Room and Board fees may be incurred each semester by students attending the Daytona Beach or Prescott campus and should be used when estimating the cost of attendance. Freshman and sophomore students may be required to live in University-managed housing and participate in the Embry-Riddle Dining Services meal program. A variety of meal plans are offered that may be supplemented with the Eagle Card to suit individual needs. Please refer to the campus financial brochure and/or Housing and Dining Services brochures for the appropriate campus for current options, requirements, and costs.

Mandatory Fees

The following fees are mandatory where applicable. Please see the financial insert at http://www.erau.edu/er/costs.html.

- Student Government Association fee
- Health service fee
- International student insurance fee
- International student service fee
- Technology fee
- Student facility fee (Daytona Beach campus only)

User Fees

Other fees apply for services that are not considered mandatory. Please see the financial insert at http://www.erau.edu/er/costs.html.

Refund Policy

Students who officially withdraw from all classes are eligible for partial refund of tuition. Spring and fall tuition refunds at the Daytona Beach and Prescott campuses for reduction of hours are not available after the last day of add/drop. Summer term refunds at these campuses are calculated on a per course basis. During all terms the effective date of the withdrawal, as determined by the Records and Registration Office, governs refund computations. Students who are suspended for disciplinary reasons will not be eligible for a full or percentage refund. Please reference the Withdrawal/Refund Schedule applicable to the campus you are attending.

The following are refundable according to the Withdrawal/Refund Schedules:

- Tuition
- Student Government Association fees
- Housing fees (less housing processing fee)
- International student service fee
- Health service fee
- Technology fee
- Student facility fee (Daytona Beach campus only)
- Meal plans – unused balance at time of withdrawal

University Withdrawal/Refund Schedule

Fall/Spring Semesters

Period I	Class days 1-5*	100%
Period II	Class days 6-10	80%
Period III	Class days 11-15	60%
Period IV	Class days 16-20	40%

Period V	Class days 21-25	20%
Period VI	Class days 26 and after	0%

*Less $100 administrative fee

Summer A/B terms

Period I	Class days 1-3*	100%
Period II	Class days 4-6	80%
Period III	Class days 7-9	60%
Period IV	Class days 10-12	40%
Period V	Class days 13-15	20%
Period VI	Class days 16 and after	0%

*Less $100 administrative fee

Requests for refunds due to circumstances clearly beyond the student's control, such as illness or required military service, must be in writing and must be accompanied by appropriate documentation, such as a physician's statement or military orders.

A request for refund must be submitted within 60 days of the date that the student completed a change of registration. Refund petition requests will normally be processed within 10 business days. Personal appeals for denied requests must contain additional documentation not previously presented.

Department of Education Withdrawal/Refunds Policy

Students receiving financial aid who withdraw will be subject to the refund policies specified by the U.S. Department of Education. Refunds of federal aid for students who officially withdraw on or before the 60% point of the enrollment period will be determined by calculating and comparing the amounts due under the federal refund schedule and the University refund schedule.

Required Advance Tuition Deposit (New Students Only)

The deposit is refundable in full, provided written notice is furnished at least 60 days before the first day of registration for the semester.

Housing Contracts

Students who have housing contracts must contact the Housing Office to release their obligation. Any refunds will be determined at that time. All housing deposits will remain on account until the housing contract expires. The Housing Office will authorize release of the deposit to the student account.

Financial Assistance

Embry-Riddle participates in a number of federal, state, and University-administered programs that help students and their families meet educational costs.

Embry-Riddle believes the primary responsibility for financing education lies with the student and the student's family. Therefore, the student should apply for financial aid early, save money, look for ways to reduce costs, and become aware of specific program requirements by reading all financial aid publications. Financial aid awards are meant to supplement what the student and family can contribute toward costs and rarely cover all educational expenses. All financial assistance will be limited to the student's individual remaining need or Embry-Riddle's established cost of attendance.

Financial Assistance

A complete description of financial assistance programs and optional financing programs available to students and their parents is published annually by the Financial Aid Office. Students should consult this publication for information about eligibility criteria, application procedures, and deadline dates. Published information is available on the Web under the Financial Aid section (http://www.embryriddle.edu). Students who expect to need help in meeting their financial obligations are encouraged to seek such assistance through one or more of the programs available for this purpose.

Eligibility Requirements

To be considered eligible to apply for most financial programs, students must:

1. Be U.S. citizens or eligible noncitizens
2. Be enrolled or accepted for enrollment as at least a half-time student in a degree program
3. Be making satisfactory progress toward a degree
4. Be registered with Selective Service if required to do so
5. Establish financial need
6. Not be in default on a loan or owe a repayment on a previous financial aid award received at any institution

The Application Process

After applying for admission to the University, students may complete the federal application (FAFSA) at http://www.fafsa.ed.gov. Each year, students are required to reapply for financial aid. Students are mailed a federal PIN by the Department of Education to renew their aid application each year at http://www.fafsa.ed.gov. Returning students may also request application materials from the Financial Aid Office. Students attending the Extended Campus may request their financial aid materials through the center, the Financial Aid Office, or at http://www.fafsa.ed.gov. All students are encouraged to complete the FAFSA by Embry-Riddle's priority deadline of March 1.

Extended Payments

Students who use financial assistance to pay their University charges may have the payment date extended for the amount of their award if their funds are not ready to be disbursed by the date payment is due. This is called a payment extension. Any difference between the total charges and the amount of the extension granted must be paid according to the University's payment procedure. To qualify for a payment extension, students must have applied for financial assistance and must have received final approval of their award.

Programs Available

The major categories of financial assistance programs include grants, scholarships, loans, and student employment. Loans from state and federal government sources or from private lenders must be repaid; the interest rate, however, is usually low, and the repayment period is extended. Grants and scholarships do not have to be repaid, nor does the income earned through student employment. Most of these programs are based on the student's financial need.

Financial Assistance

Grants

Federal
- Federal Pell Grant
- Federal Supplemental Educational Opportunity Grant

State and Institutional
- Arizona - Leveraging Educational Assistance Partnership (LEAP)
- Arizona - Private Postsecondary Financial Assistance Program (PFAP)
- Family Grant
- Florida Student Assistance Grant
- Florida Resident Access Grant
- Florida Bright Futures Scholarship Program
- Grants from other states

Loans

Federal
- Federal Stafford Loan
- Federal Parent Loan for Undergraduate Students
- Federal Perkins Loan
- Other private-sector educational loans

Employment

Federal
- Federal Work-Study Program

Embry-Riddle
- Embry-Riddle Student Employment
- Off-Campus Referral Program
- Resident Advisor Program

Scholarships

Embry-Riddle
A limited number of academic scholarships are awarded to entering freshmen and college transfers who possess outstanding academic credentials. An incoming student's completed application for admission to the University is the only application required for scholarship awarding consideration. For more information about scholarships, students should contact the Financial Aid Office of the campus they plan to attend.

Other Financial Assistance Programs

Reserve Officer Training Corps

The following campus-based organizations provide tuition scholarships to students who meet specific academic, medical, and physical requirements. In addition, Embry-Riddle offers special financial assurances to ROTC Scholarship winners. For more information on all requirements and benefits, refer to the Special Academic Programs and Opportunities section of the catalog.
- Air Force Reserve Officer Training Corps (ROTC)
- Army Reserve Officer Training Corps (ROTC)
- Naval Reserve Officer Training Corps (ROTC)
- U.S. Marine Corps Platoon Leaders Class Program

Financial Assistance

Student Government Association Leadership Program

The Student Government Association (SGA) at each residential campus offers partial tuition waivers for elected officials of the organization. The amount of the waiver varies depending on the position held. The goal is to stimulate interest in holding elected office and to recognize the commitment student leaders make in such positions.

For information about the criteria students must meet to run in an SGA election, or for other information about the program, contact the Student Government Association office.

Flight Leadership/Fellowship Program

The Flight Leadership/Fellowship Program is available to students enrolled in the Aeronautical Science degree program. It is designed to identify, develop, and reward students for demonstrated outstanding academic and leadership abilities.

Students are selected for the Flight Leadership portion of the program based on academic excellence and leadership potential. Selection for the Flight Fellowship portion is made from those Flight Leadership students who complete all required flight courses, demonstrate outstanding academic and leadership qualities, and satisfactorily complete the Embry-Riddle Flight Instructor Evaluation and Standardization Program. While not every Flight Leadership student is offered a Flight Fellowship, those who are selected will serve as a department flight instructor and tutor while finishing their degree requirements.

The Flight Leadership Program is highly competitive. Interested students should contact the chief flight instructor for additional information.

Athletic Grants

The University offers a limited number of Athletic Grants for qualified students. Awards are available for baseball, basketball, golf, men's and women's soccer, men's and women's tennis, wrestling, women's volleyball, and men's and women's cross-country. The maximum value permitted by the NAIA is the actual cost of tuition, room, board, books, and fees. However, most grants are awarded as partial tuition waivers. To qualify, students must meet both University and NAIA eligibility requirements. The grants are highly competitive, and interested students should contact the Athletic Department for specific details.

Ronald E. McNair Scholars Program

Named in honor of the African-American mission specialist who died in the 1986 Challenger disaster, and funded by a U.S. Department of Education TRiO grant, this prestigious diversity program offers financial aid and academic and other support services to eligible under-served (low income/first generation) and/or under-represented (certain ethnic minorities and women in certain fields of study) upper-division students who are interested in pursuing graduate studies leading to a Ph.D. after leaving Embry-Riddle. In addition to some financial aid, the program provides academic mentoring, academic and career counseling, Graduate Record Examination (GRE) preparation, a three-hour course in research methodology and statistics, funded research opportunities, and cultural/social activities. Acceptance in the program is based on a special application process and is selective. Eligible transfer students are welcome to apply.

For more information, contact:

McNair Scholars Program
(928) 777-6935
brandsd@erau.edu
http://mcnair.pr.erau.edu

Veterans Education Benefits

Embry-Riddle degree programs are approved by the appropriate State Department of Veterans Affairs (State Approving Agency) for enrollment of persons eligible to receive education benefits from the Department of Veterans Affairs (DVA).

Students must be pursuing a degree in a specific program to be eligible to receive benefits. Admission procedures for veterans and other eligible persons are the same as those for other students. Students who do not satisfy all requirements for full admission may be certified for two terms; however, they may be required to repay the DVA for some or all benefits received if they do not achieve full admission status during that time.

Title 38, United States Code, sections 3474 and 3524, requires that education assistance to veterans and other eligible persons be discontinued when the student ceases to make satisfactory progress toward completion of the training objective. Accordingly, benefits will be interrupted for undergraduate students whose CGPA is less than 2.00 for three consecutive terms or who are otherwise subject to suspension. The DVA will be appropriately notified of the unsatisfactory progress. The student must submit a written request to reinstate education benefits. The request must include proof of academic counseling and the conditions for continued enrollment or re-entrance. The DVA will determine eligibility for reinstatement of benefits, based in part on the school's recommendation.

A veteran's progress will be measured according to University standards as published in this catalog, and the rules and regulations of the DVA apply. The criteria used to evaluate progress are subject to change. Application and interpretation of the criteria are solely at the discretion of Embry-Riddle. Students are responsible for notifying the certifying official of any change in their enrollment or change in personal information affecting their eligibility. Students also must remain in compliance with University and Department of Veterans Affairs requirements. Students may receive education benefits only for courses that are required for their designated degree program. Students who receive DVA benefits are subject to strict academic regulations and should be aware of how auditing courses, repeating a course, changing degree programs or enrollment status, and other actions may affect their eligibility to receive benefits.

For further information concerning approved programs and the application process, eligible persons should contact the Veterans Certifying Official at the campus they plan to attend.

Student Life and Services

Embry-Riddle Aeronautical University believes that a well-rounded education extends beyond the classroom. The opportunities for co-curricular involvement are limitless and are designed to encourage the personal and educational development of all students.

Student Activities

The mission of the Student Activities Office is to provide students with the opportunity to experience co-curricular programs that support and complement the educational process and contribute to a well-rounded education. Student Activities works with other areas of the campus to offer cultural, intellectual, recreational, and entertainment events for all Embry-Riddle students, while providing a learning experience not available in other academic settings.

There are over 125 clubs on the Daytona Beach campus and over 65 on the Prescott campus. Each campus has sports clubs, special interest groups, Greek life (sororities and fraternities), honor societies, aviation clubs, military organizations, and religious clubs. The Student Activities Office provides support for all these organizations in addition to assisting students in starting a new club or organization. Involvement in any club or organization develops skills in social responsibility, strong group dynamics, leadership, communication, management, budgeting, and decision making. Students have the opportunity to learn about all the organizations at the fall and spring Activities/Club Fair.

The Student Activities Office is also the point of contact for the Programming Board (Touch-N-Go Productions in Daytona Beach and Board of Campus Activities in Prescott) Leadership Development and Homecoming Activities.

For specific campus information, visit the Student Activities Office in Daytona Beach, located in room 106 in the John Paul Riddle Student Center, or in Prescott in the lower level of the Student Hangar.

Student Government Association

The Student Government Association strives to enhance student life by giving students a voice and ensuring active representation throughout the university community. The SGA creates viable and effective student services, preserves and protects the traditions of the University, and supports students and student organizations in their endeavors.

Judicial Affairs

The Dean of Students Office at the Daytona Beach and Prescott campuses offers a variety of services to assist students with problems such as personal and family emergencies. The department oversees all non-academic judicial issues and disciplinary records.

Intramural and Recreational Sports

Intramural and Recreational Sports at each residential campus strives to create an atmosphere of competition and fun by offering a wide variety of activities ranging from team sports such as flag football, volleyball, basketball, dodgeball, floor hockey, and softball to individual competition in such sports as table tennis, racquetball, and tennis. Other sports are also available on request.

The director assists chartered clubs and organizations with the use of sports facilities and equipment. An equipment-loan program offers many items for free checkout on an overnight basis with a valid University I.D. card. Students are encouraged to use all on-campus sports-related facilities (outdoor swimming pool, tennis and basketball courts, playing fields, indoor racquetball, gymnasium, and fitness center). Hours vary for each facility and are posted.

In addition to on-campus recreational activities, each area offers a virtually unlimited variety of outdoor recreational opportunities. Hiking, camping, fishing, sailing, and skiing are a few of the activities available in the surrounding area.

Whether students seek a highly competitive league to demonstrate their athletic skills or select a competition that encourages group participation for fun and to stay in shape and reduce the stress in their lives, they are sure to find what they are looking for in intramural recreational sports.

Intercollegiate Athletics

Embry-Riddle Intercollegiate Athletics brings exciting and highly competitive varsity sports to the Daytona Beach and Prescott campuses. All Embry-Riddle students are admitted to regular-season home events free of charge, and everyone is encouraged to get involved and support the Eagles. The University is a member of the National Association of Intercollegiate Athletics (NAIA) and successfully competes against opponents from all levels of college athletics. Many of the University's sports programs are ranked among the top 25 teams in the nation and are perennial contenders for conference, regional, and national championships. The 1999-2000 year saw the Eagles basketball program win the NAIA Division II national championship. Prescott's wrestling team has finished in the top seven out of eight years, including a sixth-place finish in 2005, in which they were recognized with the prestigious National Champion of Character Sportsmanship Award at the national tournament. Eagles baseball competed in the NAIA World Series in 1999, 2002, 2003, and 2004. Women's soccer has participated in the national tournament the past three years, as has women's golf, finishing fifth in the nation in 2004. Men's and women's tennis have made five consecutive national championship appearances. In addition, the Daytona Beach campus won the Florida Sun Conference Commissioner's Cup for best all-around athletic program for the fifth straight year in 2003-2004.

The University sponsors 14 intercollegiate sport programs at the Daytona Beach campus, including men's baseball, basketball, cross-country, golf, soccer, tennis, and track and field; women's cross-country, golf, soccer, tennis, track and field, and volleyball; and co-ed cheerleading. Men's wrestling, women's and men's soccer, and women's volleyball are sports sponsored at the Prescott campus. Any student who meets both University and NAIA eligibility requirements is able to compete for a position on a varsity team. Athletic grants-in-aid, in varying amounts, are generally awarded to recruited varsity student-athletes, with walk-on players earning the right to compete for scholarship assistance, when available.

For more information on the Eagles, including game schedules, rosters, results, and statistics, or to sign up for the Daytona Beach campus' student athletic support group, The Flock, log on to http://www.embryriddlesports.com.

For tryout information, contact the Intercollegiate Athletics department at the residential campus of your choice.

Student Success And First-Year Programs

The mission of the Student Success Centers at both Embry-Riddle residential campuses and of the First-Year Programs Center at the Daytona Beach campus is to increase student success and retention through a series of campus-specific services.

At the Daytona Beach campus, the Student Success Center focuses on the academic success and retention of sophomores, transfers, and readmitted students, providing academic intervention strategies, academic counseling, coordination of information about on-campus tutoring services, coordination with the Living-Learning program in the residence halls, and withdrawal interviews.

The First-Year Programs Center at the Daytona Beach campus focuses on the academic success and retention of first-year students as they transition from high school to the University. This office provides academic advisement and counseling for all first-year students, oversees the college success course offerings for the campus, and runs the "First Class" program for first-year students who begin their studies early, entering during the Summer B semester. The Center also coordinates with the Living-Learning program in the residence halls.

On the Prescott campus, the Student Success Center coordinates the college success course offerings, conducts new student academic advising, registration, and new student and parent orientation. The Center also provides tutoring services, student disability support services, exam proctoring, withdrawal, and stop-out interviews. Programs specifically designed and targeted at strengthening academic assistance and performance are also offered by the Student Success Center along with UNIV 101.

The college success course (UNIV 101) is designed to transition first-time students into the University. Professional Student Success Center staff and faculty mentors work with trained campus academic mentors (CAMS) to teach study skills, test taking, time and money management, goal clarification, guest speakers, and promoting campus involvement.

Libraries

The mission of the Embry-Riddle libraries is to provide materials, services, and facilities to students, faculty, and staff in support of the University's commitment to excellence in teaching, learning, and research. Library services and resources are provided through two main libraries: the Jack R. Hunt Library in Daytona Beach serves the Florida campus and the students of the Extended Campus, and the Prescott Library serves the Arizona campus. Both facilities are state-of-the-art and hold a combined total of over 120,000 volumes and 1,800 periodical titles in addition to government documents, reports, conference proceedings, and multimedia sources. The libraries are fully automated with online catalogs and Internet access. Both offer specialized electronic databases for Embry-Riddle students and various public-access sources for the general public. The Prescott library holds special materials relating to aviation safety in the Aviation Safety and Security Archive, and the Hunt Library houses a historical aviation collection dating from 1909. The libraries participate in local, state and national networking consortia that give students access to virtually unlimited information worldwide via the Internet and through local arrangements and reciprocal borrowing agreements. Both facilities are open over 90 hours per week (with extended hours during exam periods). Information professionals with specialized training in aviation and aerospace assist students and teach research skills, including how to identify, evaluate, and use information in all formats.

Information Technology Services

Information Technology strives to excel in service at every opportunity. Our goal is to provide our students with stable, secure, highly available, always-on systems via the Web that offer a leading-edge in technology.

Our www-based portal, known as ERAU Online, can be found at http://erau.blackboard.com. ERAU Online accounts are provided to all students. ERAU Online provides students one-stop-shopping for class and University information as well as details on campus events. ERAU Online also provides a number of services that students can access, such as email, unofficial transcripts, class grades, class schedules, account balances, and flight schedules. Additional services are available and more are continually being added. ERAU Online can be accessed from any computer with an Internet connection.

In addition to Web resources that can be accessed from any Internet connection, Information Technology also provides the following services:

- Computerized labs and classrooms
- Account IDs and email addresses
- Network storage space for class assignments
- Storage space for personal Web pages
- Assistance in connecting to the Residential Network (ResNet) for on-campus housing
- Voicemail accounts for on-campus housing
- Popular Microsoft software titles available to all students
- Telecommunications support for University Housing
- Wireless Internet access in many buildings on the Daytona Beach campus (and expanding for both residential campuses)

As the technology used in the aviation and aerospace industries grows and advances,

Student Life and Services

so are the tools of teaching our future aviation and aerospace pioneers.

Student Employment

The Student Employment Office provides assistance to students seeking part-time employment on or off campus at the Daytona Beach and Prescott locations. On-campus employment is available to students regardless of financial need. Working on or off campus not only gives students more financial support, but also helps them develop self-confidence, gain valuable employment and credit references, establish a work record, and acquire useful skills in time management, financial planning, and communication.

Because students work and serve each other at Embry-Riddle, a sense of community is created. Students are participants in the life and work of the University as well as consumers of the educational program. Embry-Riddle depends on student workers for much of the work essential to sustain day-to-day operations.

Embry-Riddle adheres to the principle of equal employment opportunities for all students.

Safety and Security

Safety and security at Embry-Riddle is provided by the University's Safety Office, an in-house unit consisting of full-time officers and part-time student assistants. The Safety office provides patrol and escort services, parking and traffic services, life safety systems, crime prevention, communications/ dispatch services, and locksmith services.

The patrol and communications sections provide 24-hour service to the University and its satellite locations. Safety officers respond to routine requests for service as well as to emergency situations. They also conduct field investigations as required and provide specialized security service to the University's flightline. The parking and traffic services section manages campus parking, traffic, and associated enforcement functions. It also provides support for special events. The crime prevention section actively engages in safety education and crime prevention programs for students, faculty, and staff. The department maintains a close liaison with local law enforcement agencies to provide the safest possible learning environment.

Campus Ministry

The University recognizes that the typical student feels challenged by the many questions, experiences, and world views encountered on campus. It also recognizes that because students are faced with a consuming social life and the subtle influence of peers, it is important to encourage and promote spiritual development. Special opportunities for deepening faith such as meetings and programs sponsored by student religious clubs and pastoral counseling are offered during the regular academic year. At the Prescott campus, a Community Interfaith Directory is published by the Counseling Office, and local church groups are invited to offer their worship services to students. At the Daytona Beach campus, worship services are available each Sunday at the Interfaith Chapel.

Disability Support Services

The University is committed to ensuring access and providing reasonable accommodation for students with documented disabilities who request assistance. The director is the coordinator of Disability Support Services at the Daytona Beach campus and Extended Campus; the director of Student Success Programs coordinates Disability Support Services for students at the Prescott campus.

Students' needs are addressed on an individual basis with regard to their specific disabilities, academic and career goals, learning styles, and objectives for personal development. Campus-specific services might include academic advisement or assistance with planning academic schedules, registration assistance and advance registration, academic intervention programs, time management training, study skills assistance, arrangements for peer tutoring, testing modifications, advocacy, and facilitation of physical access. The University does not provide diagnostic testing but will make referrals for evaluation by area specialists. Costs associated with testing referrals are the responsibility of the individual student. Because certain academic programs are FAA-certified, those programs are subject to regulation by that agency. Therefore, regulatory limitations may delay or preclude participation or licensure in those programs by persons with certain disabilities. Prospective students considering a program of study are encouraged to contact the Disability Support Services coordinator for information on eligibility concerns or campus-specific services.

Health Services

Maintaining good health promotes a productive university experience. The Health Services staff is committed to facilitating students' wellness through direct care, education, and assistance with lifestyle modification.

Services include assessment, prescriptive and nursing care, referrals, wellness education and counseling, women's health care, medical grounding of flight students, and assistance with aerospace medical concerns.

Students must satisfy the mandatory immunization requirement prior to enrollment or participate in campus-based clinics. The Medical Report form supplied by University Admissions indicates the immunizations that students must document in order to register for courses and reside in University-managed housing.

Prospective flight students should be aware that certain sensory impairments; medical, neurobiological, and psychological conditions; and prescriptive medications may delay or preclude medical certification by the FAA. These issues should be discussed with an aviation medical examiner (AME) to ensure participation in flight instruction. Students may also contact Health Services clinical staff for information on eligibility for medical certification. A copy of the student's FAA Medical Certificate, Class I or II, must be submitted to Admissions at least 60 calendar days prior to the desired enrollment date. Failure to meet this requirement may delay entry into the flight training curriculum (see the subheading "FAA Medical Certificate" found in Admission to the Residential Campuses).

Student Life and Services

Health insurance is strongly recommended for all students. Individual policies should be reviewed prior to enrollment to ascertain adequate coverage and to determine approved providers if off-campus referrals are indicated or desired. A campus group policy is available for purchase with rates determined annually. Information on benefits, premiums, enrollment, and claims is available by visiting http://www.studentresources.com or by calling, toll free, (800) 237-0903.

International students should contact the International Student Services Office about their specific insurance requirements.

Counseling Services

The college experience is highly complicated, offering students tremendous intellectual and personal opportunities, as well as difficult challenges and demands. Many students find themselves seeking counseling as a way of learning, growing, and dealing with these experiences.

Individual counseling provides an avenue for students to meet one-to-one with a counselor to discuss and explore the issues, concerns, and feelings they are experiencing. Issues addressed in counseling vary from adjustment to college life, relationship problems, and stress, to more serious problems. Counseling is available without cost to students, and the content and records of sessions are confidential.

The Residence Life Program

Embry-Riddle provides campus housing for students on the Daytona Beach and Prescott campuses. Embry-Riddle believes that the on-campus living experience is an integral and positive part of a well-rounded university education. Interaction with other students in the campus community living environment is a major contributor to student success. National research shows that students who live on campus earn better grades, tend to be more involved in campus activities, and are more likely to graduate than students who live off campus. The campus housing systems at both residential campuses offer programs and services that support the academic mission of the University and promote student success. All residence halls are staffed by specially trained personnel who are committed to helping students and promoting a positive community environment.

Residential Facilities

Residence halls on the Daytona Beach and Prescott campuses are completely furnished and air-conditioned. Housing fees include all utilities, including local phone, voicemail, Internet, and cable TV access (with the exception of Internet at the Chanute Complex in Daytona Beach). Although computer labs are conveniently located in academic buildings on both campuses, first-year students should provide their own personal computers for use in residential housing.

All residence halls have vending facilities and easy access to laundry facilities and campus dining areas. On each campus, first-year students are assigned to buildings that are specially designated for new students.

Upperclass students can live in a variety of campus residences, including suites and apartments, on a space-available basis.

Accommodations for disabled students are available on both residential campuses. Requests for these spaces should be made to the director of Housing.

Housing Policies and Application Policy

Residency Policy: All first-year students under 21 years of age with less than 28 earned credit hours are required to live in University-managed housing for their first full academic year (fall and spring). First-year students are also required to participate in the Dining Services meal program. Exceptions to the residency and board requirements are as follows:

- Students who are 21 years of age on or before Sept. 1, 2006
- Students who are legally married
- Students who are full-time, year-round residents of Volusia County, Florida (Daytona Beach campus) or Yavapai County, Arizona (Prescott campus) for a minimum of one year prior to entering Embry-Riddle

All requests for exception must be submitted in writing to the director of Housing with supporting documentation of circumstances.

Application Process:

Housing brochures and contracts are sent to students who have been accepted to the University. Completed contracts must be returned to the appropriate campus Housing Office with a $250 deposit no later than June 15, 2006, in order to receive a priority room assignment. New students over the age of 21 may apply for University-managed housing; however, assignments are made on a space-available basis.

Prescott Policy and Process:

- Completed Housing contracts received by June 15, 2006, are guaranteed a space in University-managed housing, not necessarily a specific location or room type.
- Living/Learning Community rooms are assigned based on the date of receipt of the completed Housing contract and housing deposit.

Room and Board Costs

Room rates and dining costs vary per campus. Please note the following information for each location.

Daytona Beach Campus

Room Costs: The room rate for all first-year student residence halls is $2,050 per semester, per person. Rates for upperclass student apartments are slightly higher.

Board Costs: All first-year students are required to purchase a 14-meal-per-week plan ($1,485 per semester) for each of their first consecutive fall and spring semesters. First-year students may upgrade to larger meal plans if desired.

Prescott Campus

- 2-person bedroom: $2,050 per semester, per person, per double occupancy, Thumb Butte Complex, first-year students only
- 2-bedroom suite: $2,050 semester, per person, per double occupancy, Village Complex, first-year students only
- 3-bedroom suite: $1,900 per semester, per person, per double occupancy
- 3-bedroom suite with kitchenette: $1,975 per semester, per person, per double occupancy, Mingus Mountain Complex

Student Life and Services

- 2-bedroom apartments: $2,050 per semester, per person, per double occupancy, Village Complex, upperclass students

Board Costs:

All first-year students are required to purchase a minimum seven-day all-access meal plan ($1,499 per semester) for each of their consecutive fall and spring semesters. First-year students may upgrade to a larger meal plan if desired.

New Students:

- Students released or who cancel the housing contract on or after the first day of classes will be charged an $800 administration fee.

Current Students:

- Current students released or who cancel the housing contract after April 30, 2006, will be charged an $800 administration fee.

Eagle Card

The Eagle Card is the official Embry-Riddle Aeronautical University identification card for all students that you will receive at orientation. It should be readily available at all times to present to University officials who may request verification. The Eagle Card is the property of Embry-Riddle Aeronautical University, which reserves the right to revoke use of the Eagle Card on any of its accounts at any time. Only the individual to whom it is issued may use the Eagle Card. Other uses include:

Activity Card: Your Eagle Card allows you access to student activities, events, games, voting, and other services provided by Embry-Riddle.

Access Card: If you reside in on-campus University Housing, your Eagle Card will give you access to the residence halls. Also, certain labs and buildings require the use of an Eagle Card for entry.

Library: You must present your Eagle Card each time you check out library materials.

Debit Card: Your Eagle Card offers two debit accounts that are managed by the University. The Eagle Dollar account can be used at any University point of sale, including vending, copy, and laundry machines. The Flight account can only be accessed at the Flight Payment Stations to pay for any of your flight activities.

Meal Plans: These are accessed via your Eagle Card. (See the Dining Services section for more information regarding meal plans.)

Deposits

The Eagle Dollars and Flight Account minimum deposit is $1.00. Deposits to either account can be made at the Cashier Office or via the Web at http://www.erau.edu/eaglecard. The University reserves the right to suspend any account if a negative balance goes unpaid for more than 30 days, or if a student account is delinquent.

Transactions

The cardholder must present their Eagle Card at the time of purchase. All sales transactions charged to an account through the use of the Eagle Card are final at the point and time of sale. The cardholder is responsible for observing the amount charged during the transaction and monitoring balances. A cardholder can check their account balances online at http://www.erau.edu/eaglecard.

Statements

The cardholder may request a detailed statement of the Eagle Card transaction history and/or activity at the Eagle Card Center.

Account Closing and Refund

Your funds in an Eagle Card account are not transferable and there are no cash withdrawals permitted from the account(s). The funds will stay there semester-to-semester, year-to-year, and will not be refunded unless the cardholder withdraws, graduates, or is dismissed from the University, with proof required. Flight Account refunds can be requested upon Flight Course completion or withdrawal from the Flight program. A request for a refund must be submitted to the Eagle Card Center in writing. There is a $10.00 processing fee that will be applied to any remaining funds in your Eagle Dollars account.

Lost or Stolen Card

The cardholder is required to immediately contact the Eagle Card Center during normal business hours (8 a.m. to 4 p.m.), the Safety Office after business hours, or via the Web at http://www.erau.edu/eaglecard, if an Eagle Card is lost or stolen. The cardholder is responsible for all transactions charged to their accounts prior to proper notification to the Eagle Card Center, the Safety Office, or via the Web. Once the card has been reported as lost or stolen, all accounts and privileges accessed with use of the Eagle Card will be deactivated.

Replacement of Lost/Stolen or Replacement Cards

A replacement fee of $10.00 will be charged for lost cards. The fee will be waived if a card was reported as stolen and a report number was issued from Campus Safety. Temporary cards are available free of charge for up to seven days. A replacement fee of $5.00 will be charged for damaged cards if the cardholder turns in the nonfunctioning card to the Eagle Card Center.

Error Resolution

If you feel there has been an error on your account, please notify the Eagle Card Office within 60 days from the date of the transaction in question. In order to resolve the problem we will require the following:

- Name, student ID number, and Social Security number
- Description of the error or transaction in question
- Dollar amount of the transaction in question
- A clear explanation of why you believe there is an error

Disclosure of Accounting Information to Third Parties

The University will disclose information to third parties about the account holder's account(s) or the transfer made only: (1) in order to comply with court orders or other applicable laws, or (2) if the account holder gives written or verbal permission, or (3) if the student's account receivables is in the third party's name. All policies and procedures are subject to change

Student Life and Services

Dining Services

A variety of nutritious and satisfying dining services and meal plan options are offered on the Daytona Beach and Prescott campuses. At both locations, dining facilities are conveniently located to residence halls and offer a wide range of food selections, from full hot meals to fast food and snacks. Students can also enjoy weekly specials and events such as cookouts, buffets, and celebrations. Dining service hours are designed to meet the needs of students, with meals available throughout the day. Accommodations can be made for students with special dietary needs or medical conditions. Dining service personnel are available to consult with students on an individual basis. Requests for special services should be made to the director of Dining Services at each campus.

Meal plan requirements and options vary per campus. Please note the following information for each location.

Daytona Beach Campus

All first-year students are required to purchase a minimum 14-meal-per-week plan for each of their first consecutive fall and spring semesters. This minimum required plan provides 14 full meals per week and flexible Riddle Bucks that can be used to purchase individual food items at any campus dining location. First-year students may upgrade to a larger meal plan that offers 19 meals per week. Detailed dining service information will be sent to all incoming first-year students to help with their meal plan choice.

Prescott Campus

All first-year students are required to purchase a minimum seven-day all-access meal plan ($1,499 per semester) for each of their consecutive fall and spring semesters. This plan includes $75 in Flexi cash that can be used to purchase individual items to go at any campus dining location. First-year students may upgrade to a larger meal plan that offers $350 in Flexi cash. Other plan options are available for students not required to live in University-managed housing with information available from the Housing Office.

Mail

Daytona Beach Campus

Prior to a student's arrival, all personal mail, UPS, Federal Express, deliveries, etc., should be addressed as follows:

IF BOX NUMBER IS KNOWN:

This format for USPS only:
Student Name (include middle initial)
P.O. Box 14____
Daytona Beach, FL 32114-3977

This format for UPS and FEDEX:
Student Name (include middle initial)
Mail # 14____
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3977

IF BOX NUMBER IS UNKNOWN:
Student Name
"New Student"
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900

Prescott Campus

Prior to a student's arrival, all personal mail, UPS, Federal Express, deliveries, etc., should be addressed as follows:

IF BOX NUMBER IS KNOWN:
ERAU Box #____
Student Name
3700 Willow Creek Road
Prescott, AZ 86301-3720
IF BOX NUMBER IS UNKNOWN:
Student Name
ERAU New Student
3700 Willow Creek Road
Prescott, AZ 86301-3720
All students are assigned a mailbox and are required to check it on a daily basis.

International Student Services

The International Student Services Office at Daytona Beach and the Center for International Programs and Services (CIPS) at Prescott serve as the central point of contact for issues concerning international students at Embry-Riddle. An International Student Orientation is held each semester to familiarize students with University policies and procedure as well as the American education system in general. The office provides services that include advising students on immigration regulations and financial and personal matters. The office also assists international students with the processing of forms and documentation of status required by foreign governments, sponsors, the U.S. government, and the University.

International Student Services staff members continually strive to provide opportunities for international students to become involved in campus and community programs that promote a cross-cultural awareness with University faculty, staff, and students as well as the local communities of Daytona Beach and Prescott. Some of these activities include International Days on both campuses, programs with local families to introduce students to the community, speaking engagements in local schools and at community service organizations, and trips to area attractions such as amusement parks, national parks, and cultural festivals.

Career Services Office

The Career Services Office provides career resources and career development assistance to all Embry-Riddle students and alumni. The Career Services Web site offers students and alumni a virtual library of job search aids, including interview tips, sample resumes and cover letters, company profiles, direct links to employment Web sites, cooperative education/internship opportunities, current job listings, and a Web-based resume referral service.

Industry/Career Expos are held in the fall on both campuses. Over 100 companies visit the campuses to recruit students for full-time, cooperative education, and internship opportunities and to provide information on the industry. On-campus interviews and informational presentations are also scheduled year-round.

The Career Services Office employs a staff of program managers to provide one-on-one career advisement, mock interviews, and resume critique services. The Career Services Office encourages students to contact them early in their education to explore career options and to develop a successful job search strategy.

Academic Programs by Campus Location

Embry-Riddle offers students opportunities to pursue academic programs in a wide variety of aviation and aerospace fields. Each degree program includes both general education and academic specialization, the two components complementing each other. Detailed information about specific degree programs begins on page 66 of this section of the catalog. Minor courses of study are described in the following section.

The University currently offers the following bachelor and master degree programs at its residential campuses.

Daytona Beach, Florida, Campus

College of Arts and Sciences

B.S. in Aerospace Studies

B.S. in Communication

B.S. in Engineering Physics

B.S. in Human Factors Psychology

B.S. in Human Factors Psychology/ M.S. in Human Factors and Systems

B.S. in Space Physics

M.S. in Human Factors and Systems

M.S. in Space Science

Still Exploring

College of Aviation

B.S. in Aeronautical Science

B.S. in Aeronautics

B.S. in Aerospace Electronics

B.S. in Air Traffic Management

B.S. in Applied Meteorology

B.S. in Aviation Maintenance Science

B.S. in Homeland Security

B.S. in Safety Science

M.S. in Aeronautics

Still Exploring

College of Business

B.S. in Aviation Business Administration

B.S. in Aviation Management

M. of Business Administration in Aviation

Still Exploring

College of Engineering

Accelerated Program in Aerospace Engineering

B.S. in Aerospace Engineering

B.S. in Civil Engineering

B.S. in Computer Engineering

B.S. in Computer Engineering/ M.S. of Software Engineering

B.S. in Computer Science

B.S. in Electrical Engineering

B.S. in Mechanical Engineering

B.S. in Software Engineering

B.S. in Software Engineering/ M.S. in Software Engineering

M. of Aerospace Engineering

M.S. in Aerospace Engineering

M. of Software Engineering

Still Exploring

Prescott, Arizona, Campus

College of Arts and Sciences

B.S. in Aerospace Studies

B.S. in Aviation Business Administration

B.S. in Computer Science

B.S. in Global Security and Intelligence Studies

B.S. in Science, Technology, and Globalization

B.S. in Space Physics

Still Exploring

College of Aviation

B.S. in Aeronautics

B.S. in Aeronautical Science

B.S. in Applied Meteorology

B.S. in Safety Science

M.S. in Safety Science

Still Exploring

College of Engineering

B.S. in Aerospace Engineering

B.S. in Computer Engineering

B.S. in Electrical Engineering

Still Exploring

Embry-Riddle reserves the right to terminate or modify program requirements and content, as well as the sequence of program offerings from term to term, for educational, financial, or other reasons that it determines are sufficient to warrant such action.

Basic Skills Requirement

Embry-Riddle recognizes the importance of communication and quantitative skills in all areas of aviation. Successful pilots, airport managers, aviation maintenance technicians, and other aviation professionals must possess these skills to perform their jobs effectively. Embry-Riddle, therefore, requires all students, including transfer students, to demonstrate proficiency in writing, reading, and mathematics before they are permitted to complete registration during their first term at the University. Proficiency may be demonstrated by earning qualifying scores on SAT/ACT tests, or by transferring credit for college-level English and mathematics courses.

If they cannot demonstrate proficiency in these basic skills, students must enroll in COM 020, Fundamentals of Communication, a reading, writing, and critical thinking skills course. Quantitative skills courses (MA 006, MA 106) help students prepare for introductory mathematics courses required in the various degree programs.

Students whose primary language is not English are required to demonstrate advanced English proficiency by achieving a satisfactory score on a placement test. Students unable to demonstrate such proficiency must enroll in appropriate basic skills courses in their first term at the University. These courses are COM 008, Academic English, and COM 018, Advanced Academic English.

Although basic skills courses are computed into the student's term grade point average (GPA) and cumulative grade point average (CGPA), credits earned in basic skills courses do not apply to minimum degree requirements in any degree program.

Embry-Riddle Honors Program

The Honors Program at Embry-Riddle is highly selective, offering students an enriched educational experience while also giving them opportunities to enhance campus and community life for others. Honors Program students enroll in several general education seminars focused on relevant, stimulating, interdisciplinary topics that encourage critical and creative thinking. Honors classes are small, the faculty are carefully selected, and the courses are student-centered and discussion-oriented. The Honors experience in the major emphasizes close involvement with selected faculty, research opportunities, and individually tailored projects. The program also adds to campus life through its guest speaker series and through activities sponsored by its student organization. Graduates of the Honors Program are models of academic excellence and student leadership.

Some features of the Honors Program:

- Nine credit hours of Honors in general education; nine credit hours of Honors in the major. The Honors Program does not add credit hours to any major.
- Honors seminars no larger than 20 students.
- Honors faculty.
- Guest speakers who spend time with students in Honors seminars.
- Honors housing for freshman students.
- Priority registration for classes.
- Research opportunities.
- Co-op and internship opportunities
- Summer study-abroad opportunities.

Academic Programs

General Education

Introduction

Recognizing its general and special missions in education, Embry-Riddle embraces a general education program. This course of study ensures that students possess the attributes expected of all university graduates. Encouraging intellectual self-reliance and ability, the general education program enables students, regardless of their degree program, to understand the significance of acquiring a broad range of knowledge.

Throughout the general education program, students gain and enhance competence in written and oral communication. They practice reasoning and critical thinking skills and demonstrate computer proficiency. As students engage in this course of study, they familiarize themselves with and investigate ideas and methodologies from several disciplines. These include the arts and humanities, the social sciences, and the natural sciences and mathematics. The program also helps students recognize interrelationships among the disciplines.

Promoting the appreciation of varied perspectives, the general education program provides intellectual stimulation, ensuring that students are broadly educated. This course of study empowers students to make informed value judgments, to expand their knowledge and understanding of themselves, and to lead meaningful, responsible, and satisfying lives as individuals, professionals, and concerned members of their society and the world.

General Education Requirements

Embry-Riddle's general education program encourages effective learning and provides a coherent base for students to pursue their academic specializations. In specific support of the goals of general education, candidates for bachelor degrees must complete coursework or demonstrate competency in the following areas. The faculty certify all coursework accepted for general education credit as advancing general education objectives. They additionally establish methods for students to demonstrate competency in these areas of study. **Because certain degree programs require particular courses in the general education program, refer to the degree requirements section of the catalog before selecting general education courses.**

I. Communication Theory and Skills
9 hours
In order to lead meaningful and responsible lives in complex societies, students produce, evaluate, articulate, and interpret information and meanings in oral and written communications.

II. Mathematics
6 hours
In order to develop quantitative reasoning skills and to use and understand the language of science and technology, students must demonstrate mathematical proficiency for three of these hours by placement, examination, or course completion. One course must have college algebra as a prerequisite.

III. Computer Science/Information Technology
3 hours
In order to use computers and to understand and evaluate their significance in the solution of problems, students study the concepts, techniques, and tools of computing.

IV. Physical and Life Sciences
6 hours
In order to appreciate current understandings of the natural world, students study the concepts and methods of the physical and life sciences, applying the techniques of scientific inquiry to problem-solving. All students participate in a laboratory experience.

V. Humanities
3-6 hours lower-level
*3 hours 300-400 level
In order to participate in the complexity of human experiences that arise in a framework of historical and social contexts, students are exposed to the humanities. Such areas of studies may include cultural, aesthetic, philosophical, and spiritual dimensions of the human condition.

VI. Social Sciences
3-6 hours lower-level
*3 hours 300-400 level
In order to understand interrelationships between the individual and society and connections between historical memory and the future, students examine the social sciences, including history, economics, psychology, or sociology.

General Education Requirement 36 Hours Total

* In order to experience advanced studies in either the Humanities or Social Sciences, students must choose at least one upper-level elective in the Humanities or Social Sciences.

Still Exploring Engineeering Freshman

Students exploring engineering who have not selected a specific degree program may, during their freshman year, enroll in the courses listed in the common engineering first-year catalog description. This enables an engineering student interested in engineering to explore the content of all the engineering programs over their freshman year prior to declaring a major at the beginning of their sophomore year. The courses apply toward any engineering degree. Still Exploring students should follow the common freshman engineering program, then select a degree program upon completion. After a degree program is chosen, an advisor will be assigned to you with whom you will discuss courses to take and your future career goals. Pre-college preparation in math and physics is essential for success in engineering. If it is necessary to enroll in more basic math and physics courses to ensure that preparation, students should understand it may take them longer to complete the degree they choose.

Communication Theory and Skills (One course must be college composition.)	**6**
Computer Science /Information Technology Elective	**3**
Humanities (Lower-Level)	**3**
Social Sciences	**6**
Mathematics (Highest placement possible; one course for which college algebra is a prerequisite.)	**6-8**
Physical Sciences	**6-10**
(One course must contain a laboratory.)	
UNIV 101 (required)	**1**

Academic Programs

The Common First-Year Engineering Program

The Common Freshman Engineering Program is a joint responsibility between the College of Engineering and all departments in the College. The purpose of this coordination is to ensure success of all engineering programs at the freshman level. In industry, engineers in a certain discipline have to work with engineers in other disciplines, so it is in the best interest of our engineering students that they interact with students in other engineering programs. This is accomplished via team projects, field trips, and invited colloquium speakers.

The First-Year program ensures that instructors involved in the program have the appropriate quality and experience to teach the freshman courses. The program maintains consistency in the continuous processes of outcomes assessment throughout all the College of Engineering curricula as required by the program's accrediting agencies. The program also deals with personnel matters that may arise in freshman engineering courses.

The College of Engineering First-Year Advising Program focuses on advising and retaining all engineering freshmen starting from the time they make their tuition deposit until they finish their first year.

Academic Programs at the Daytona Beach Campus

College of Arts and Sciences

Dr. Rodney Piercey, Dean

The College of Arts and Sciences is home to several outstanding degree programs and, in addition, is the primary provider of the curricula that fulfill the university's general education goals. Students may choose to pursue such majors as Aerospace Studies, Communications, Engineering Physics, Space Physics, and Human Factors Psychology. Minor programs of study are offered in Mathematics as well as many of the major fields.

The College of Arts and Sciences' primary responsibility is to provide a high-quality educational opportunity to all adequately prepared students. It seeks to inculcate in its students a lifelong love of learning, an appreciation of the cultural, intellectual, and historical impact of the search for truth and knowledge; the opportunity for professional specialization; and emotional and social development through out-of-class experiences. All students are expected to master the skills that enable them to communicate clearly, to understand the logic of mathematics and the methods of scientific inquiry, and to understand their cultural heritage and that of others. The College seeks to develop in its students the ability to think independently, to accept responsibility, to interact with people different from themselves, to assess ideas, to challenge orthodoxies, and to criticize opinions in order to achieve the intellectual, ethical, and aesthetic maturity expected in educated citizens. The College affirms the right of all students to achieve an educational level limited only by their own commitment and ability.

The College endorses the use of nontraditional experiences to enhance learning, including cooperative education, industry internships, study abroad, and undergraduate research involvement. The College participates in the university Honors Program; thus students of exceptional academic promise can experience unique and challenging programs of study.

The College of Arts and Sciences is home to Air Force, Army, and Naval Reserve Officers Training Corps (ROTC). The ROTC programs give students an opportunity to receive military training while pursuing a baccalaureate degree. Several significant scholarships are available for students interested in these excellent programs.

Aerospace Studies

Bachelor of Science

Program Plan of Study and Requirements

A unique interdisciplinary degree program, Aerospace Studies offers students an opportunity to design a program of study that serves their needs and aspirations. The program consists of core requirements and three minors, nurturing worldly thinkers who undertand that information and skills gleaned from one area of life can be applied to other areas. The program's core requirements respond directly to calls by American corporate leaders for graduates who understand both technology and human behavior. To that end, students choose from courses in the humanities, geography, international studies, philosophy and ethics, and psychology. The core prepares students to connect their three minor fields of study meaningfully and usefully. In the capstone experience, the student chooses a senior thesis or a co-op in industry.

By selecting three intersecting minors, students design their own degree programs. Such combinations as security or air traffic control/psychology/safety or space studies/computer science/psychology reflect areas of expertise that aerospace employers find compelling. Minors in secondary education, humanities, and mathematics can lead to the teaching profession or graduate studies. Minors in the business areas provide students with practical knowledge that combines well with the more technical areas. The element of choice in the program gives students experience in planning their own futures: the program seeks to produce students with an entrepreneurial spirit who will cross boundaries, make creative connections, and become leaders in aviation and aerospace.

Degree Requirements

The Bachelor of Science degree in Aerospace Studies requires successful completion of a minimum of 120 credit hours. Included in the 120 credit hours must be 40 credit hours of upper-division courses (300-400 level.)

General Education

Courses	Credits
Communication Theory and Skills*	9
Computer Science	3
Lower-Level Humanities*	3
Mathematics	6
Physical and Life Sciences	6
Lower-Level Social Sciences*	6
HU/SS 300-400 level*	3
Total Credits	**36**

*Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories.

Communication Theory and Skills

COM 122, 219, 221, 222, 260, 351, 360, 364, 410, 411, 415, 420
HU 319, 355, 361, 362, 363, 399, 415, 499

Humanities

LOWER-LEVEL:
HU 140-146

UPPER-LEVEL:
300-400 level

Social Sciences

LOWER-LEVEL:
EC 200, 210, 211
(EC 200 is not acceptable together with EC 210 or EC 211 or their equivalent.)
PSY 220
SS 110, 120, 130, 204, 210

UPPER-LEVEL:
HF 300
PSY 350
SS 302, 305, 310, 320, 325, 326, 331, 340, 350, 352, 360, 399, 499

Core Requirements

Course		Title	Credits
AS	120	Intro to Aeronautical Science -OR-	
AS	110	Introduction to Space Flight -OR- Private Pilot Certificate	3
BA	105	American Business Enterprise -OR-	
BA	201	Principles of Management	3
CE	396/397	Cooperative Education -OR-	3-6
HU	475	Senior Thesis	3
HU	335	Technology and Modern Civilization	3
		- OR -	
HU	338	Traversing the Borders	3
HU	330	Values and Ethics	3
		-OR-	
HU	341	World Philosophy (if not taken for general education credit)	3
HU/SS		International Studies Electives (selected from SS 325, 326, 331, 333 or 340)	6
HU*		One course from the Humanities Series (HU 140-146) -OR-	
SS	204	Introduction to Geography	3
MA	222	Business Statistics (if not taken for general education credit)	3
PSY	220	Introduction to Psychology (if not taken for general education credit)	3
Total Credits			**21-33**

* Must be chosen from one of the courses above not used to satisfy general education credit.

Minors

Students must select three minor fields of study. At least one of these must be aviation/aerospace related. Total credits in the minors will vary from 18-30, depending on the minors chosen. See Minor Courses of Study in this catalog.

Open Electives	**0-21**
Total Degree Credits	**120-132**

Academic Programs at the Daytona Beach Campus

Communication

Bachelor of Science

The Bachelor of Science in Communication requires students to integrate knowledge of science and technology with practice in communication. In this program, students learn how scientists think, how they frame research questions, and how they use various methodologies to pursue their goals. Communication students additionally practice gathering, analyzing, and disseminating scientific and technological information to a variety of audiences. A significant element of the program is the capstone experience, an internship in which students put theory into practice.

As modern society is increasingly influenced by developments in science and technology, the demand for skilled communicators in these fields continues to grow. Aviation, aerospace, and business industries, for example, require more internal communications specialists, as well as professionals in media and public relations, to relay information clearly and accurately. This program addresses that nationwide necessity.

News organizations rely on science communicators in various fields, including meteorology, environmentalism, medicine, and technology. Communication students work in traditional written media, such as newspapers, newsletters, magazines, and journals, as well as in cutting-edge information retrieval and delivery systems, including Web sites and networked blogs.

This focused, yet flexible, course of study requires students to hone specialized communication skills and to produce portfolios displaying those skills. These graduates, the next generation of communication specialists, are positioned to enter three specific career paths, including: 1) communicating science information to specific and general audiences through a variety of mass media, 2) representing companies and organizations through media relations, using written, oral, and visual media, and 3) communicating news to general audiences through print and electronic media.

Degree Requirements

The Bachelor of Science degree in Communication requires successful completion of a minimum of 120 credit hours, of which 40 credit hours must be upper-division courses (300-400 level.)

The Communications program requires coursework in General Education, the Communication Core, Communication Specified Electives, a Minor, and Open Electives:

General Education

Courses	Credits
Communication Theory & Skills	9
Computer Science	3
Lower-Level Humanities*	3
Mathematics	6
Physical and Life Sciences	6
Lower-Level Social Sciences*	6
HU/SS 300-400 level*	3
Total Credits	**36**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below,

assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories.

COMMUNICATION THEORY AND SKILLS
COM 122, 219, 221

HUMANITIES
Lower Level: HU 140-146
Upper-Level: 300-400 level

SOCIAL SCIENCES
Lower Level: EC 200, 210, 211 (EC 200 is not acceptable together with EC 210 or EC 211 or their equivalent.), PSY 220 SS 110, 120, 130
Upper Level: HU 319, 363, 415, 375, 412, 420, 460 SS 325, 326, 332, 333, 334, 336, 363

CORE REQUIREMENTS

The Communication core comprises three components: Required Communication Courses, Aviation and Aerospace Foundation Courses, and Science Foundation Courses.

Required Courses

This component of the Communication Core requires students to complete eight courses, including the following:

Course	Title	Credits
COM 260	Introduction to Media	3
COM 265	Introduction to News Writing	3
COM 225	Science & Technology Communication	3
COM 320	Mass Communication Law & Ethics	3
COM 322	Aviation & Aerospace Communication	3
COM 330	Environmental Communication	3
COM 410	Advanced Professional Writing -OR-	
COM 360	Media Relations I	3
CE 396/7	Internship/Co-Op -OR-	
COM 399/499	Directed Study	3
Total Credits		**24**

Aviation/Aerospace Foundation Courses

This component of the Communication Core requires students to complete two courses from among the following:

Course	Title	Credits
AS 120	Principles of Aeronautical Science	3
SS 130	History of Aviation	3
SP 110	Introduction to Space Flight	3
Total Credits		**6**

Science Foundation Courses

This component of the Communication Core requires students to complete two courses from among the following:

Course	Title	Credits
HU 335	Technology & Modern Civilization	3
SS/PS 302	Evolution of Scientific Thought	3
HU 302	Contemporary Issues in Science	3
Total Credits		**6**
Total Credits for Communication Core		**36**

SPECIFIED ELECTIVES

To supplement coursework from the Communication Core, students complete five classes selected from among the following specified electives in Communication, Humanities, and Social Sciences:

Course	Title	Credits
COM 364	Visual Design	3
COM 411	Web Design Workshop	3
COM 412	Advanced Technical Writing	3
HU 143	Introduction to Rhetoric	3
HU 319	Advanced Speech	3
HU 363	Communication and Society	3
HU 415	Nonverbal Communication	3
HU 375	Nature of Language	3
HU 420	Applied Cross-Cultural Communication	3
HU 460	Media Relations II	3
International Relations Course(s), including SS 325, 326, 332, 333, 334, 336, 363		3 each
Total Credits		**15**

MINOR

In consultation with their advisor and/or Communication program coordinator, students select a minor that enhances their knowledge base and increases their job prospects. Total credits in the minor vary, depending on the minor chosen. Suggested minors include:

Minors	Required Credits
Environmental Studies	15-16
Human Factors	15

Academic Programs at the Daytona Beach Campus

International Relations	15
Business Administration	18
Information Technology	18
Aeronautical Studies	18-19
Aviation Safety	15
Aviation Weather	15
Space Studies	15

Open Electives

Students complete open electives, experiencing the breadth of curriculum offerings of the University or selecting an additional minor.

Open Electives: Total Credits **14-18**

Total Degree Credits **120**

Engineering Physics

Bachelor of Science

The Bachelor of Science in Engineering Physics, offered only on the Daytona Beach campus, is designed to produce graduates who can operate at the interface between scientists and design engineers. Combining the skills of engineering and applied physics, this hybrid-engineering program focuses on the scientific challenges and planning associated with mission design and research related to the space environment. Because of the strong emphasis on fundamentals, the Engineering Physics program provides not only an excellent stepping stone into the space program, but also the flexibility to enter a broad variety of engineering applications and graduate programs.

The Engineering Physics degree program has full engineering accreditation by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21204- 4012, telephone: (410) 347-7700, and is administered by the Physical Sciences Department. This program supports the University's purpose "to provide a comprehensive education to prepare graduates for productive careers and responsible citizenship with special emphasis on the needs of aviation, aerospace engineering, and related fields." To achieve this, the following educational objectives are used to guide the program:

- Mathematical, scientific, and engineering methodologies. Fundamental understanding and effective use of mathematical, scientific, and modern engineering tools in the professional practice of engineering.
- Engineering ethics and professional development. Preparation for successful careers built upon understanding of ethics and professionalism, good citizenship, and on the ability to be a lifelong learner.
- Communication and interdisciplinary teaming. Demonstration of oral and written communication skills, and ability to work in teams across disciplines.
- Technical skills and social responsibilities. Development of the ability to identify, formulate, and solve real-world technical problems, incorporating political, economic, and environmental considerations.

Admission Requirements

To enter this program, students must have completed four years of high school science and mathematics, demonstrating a high level of competency. Successful candidates for this program will be prepared to enter Calculus I and Chemistry for Engineers.

Degree Requirements

The Bachelor of Science in Engineering Physics degree program requires 136 credit hours. The program can be completed in eight semesters and one summer term. The courses necessary to earn this degree are listed below.

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog

Academic Programs at the Daytona Beach Campus

before registering for classes to ensure requisite sequencing.

A grade of C or better is required in MA 241, MA 242, MA 243, PS 215, PS 208, and PS 219.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Humanities*	3
		Lower-Level Social Sciences*	3
EGR	111	Engineering Drawing	2
EP	101	Current Topics in Space Sciences	1
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
PS	140	Chemistry for Engineers	4
PS	141	Chemistry for Engineers Laboratory	1
PS	215	Physics I	3
PS	216	Physics Laboratory I	1
Total Credits			**32**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
EGR	115	Intro to Computing for Engineers	3
ES	201	Statics	3
ES	202	Solid Mechanics	3
ES	204	Dynamics	3
HU		Humanities Elective	3
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	208	Physics II	3
PS	219	Physics III	3
PS	220	Physics Laboratory III	1
PS	290	Physics Laboratory Practicum*	0
Total Credits			**33**

* May be taken in the fourth or fifth semester.

JUNIOR YEAR

Course		Title	Credits
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering Laboratory	1
EP	320	Electro Optical Engineering	3
EP	340	Introduction to Space Systems Design	2
EP	393	Spaceflight Dynamics	2
EP	394	Space Systems Engineering	3
ES	206	Fluid Mechanics	3
ES	305	Thermodynamics	3
MA	441	Advanced Engineering Mathematics I	3
MA	442	Advanced Engineering Mathematics II	3
PS	303	Modern Physics	3
PS	305	Modern Physics Laboratory	1
PS	320	Classical Mechanics	3
Total Credits			**32**

SUMMER SESSION
(Must be taken before seventh semester)

Course		Title	Credits
SS/PSY		Elective	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Lab	1
		Open Elective	3
Total Credits			**9**

SENIOR YEAR

Course		Title	Credits
		Engineering Elective	3
HU		Upper-Level Humanities Elective	3
EP	391	Microcomputers and Electronic Instrumentation	3
EP	410	Space Physics	3
EP	440	Engineering Electricity and Magnetism	3
EP	455	Quantum Physics	3
EP	496	Space Systems Design I	2
EP	497	Space Systems Design II	3
ME	200	Machine Shop Laboratory	1
SS		Upper-Level Social Sciences*	3
		Open Elective	3
Total Credits			**30**

TOTAL DEGREE CREDITS **136**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities and Social Sciences, and the Engineering Electives may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Engineering Physics vertical outline.

COMMUNICATION THEORY AND SKILLS
COM 122, 219, 221, 222, 351, 360

HUMANITIES
LOWER-LEVEL:
HU 140-146, 250
UPPER-LEVEL:
HU 300-400 level

SOCIAL SCIENCES
LOWER-LEVEL:
EC 200
PSY 220
SS 110, 120, 130, 204, 210
UPPER-LEVEL:
HF 300

Human Factors Psychology

Bachelor of Science

The Bachelor of Science degree in Human Factors Psychology emphasizes human behavior, ergonomics, and human capabilities. The program seeks to develop a student with the capacity to design, conduct, and apply human factors research to the design of simple and complex systems. The goal of the program is to educate and graduate professionals who are equipped for employment as human factors specialists or to continue their education in graduate school.

Human Factors Psychology is an applied discipline which develops knowledge concerning the abilities and limitations of humans to sense, store, and process information, as well as to act. This knowledge is applied to the design, use, and maintenance of human/machine systems. Depending on its goals, the system is then optimized with respect to human performance. The environmental factors affecting system performance are recognized as important and are considered systematically. When relevant data are not available, they must be uncovered through research efforts. This requires considerable skill in experimental design and quantitative methodology. Students will receive training in the content and techniques of human factors, including statistical and quantitative procedures, experimental design, survey methods, computer techniques, and other research methodologies.

Degree Requirements

The Bachelor of Science in Human Factors Psychology can be earned in eight semesters, assuming appropriate background and full-time enrollment. Successful completion of a minimum of 122 credit hours is required.

Students are encouraged to choose a minor field of study. Minors that complement Human Factors are Air Traffic Control, Aviation Safety, Computer Science, Flight, and Mathematics. Most minors can be accommodated within the 18 hours of open electives required in the program.

Students will be encouraged to have an applied practicum experience. This requirement may be fulfilled in several ways, including co-ops, internships, or working on an on-campus research team. Practicums provide opportunities to gain practical experience in real-world settings. A practicum experience is highly regarded by employers and increases the student's employment potential after graduation. Typically, students will engage in practical experience activities toward the end of the degree program so they can take maximum advantage of their undergraduate experience.

General Education

Courses*	Credits
Communication Theory and Skills	9
Mathematics	6
Computer Science	3
Physical and Life Sciences (one course must include a laboratory)	6
Lower-Level Humanities	3

Lower-Level Social Sciences 6
HU/SS 300-400 level. 3

Total Credits **36**

Embry-Riddle courses in general education may be chosen from those listed below, assuming prerequisites are met. Courses from other institutions are acceptable if they fall into these broad categories.

COMMUNICATION THEORY AND SKILLS

COM 122, 219, 221, 222, 351, 360, 364, 410, 411, 412
HU 143, 319, 351, 355, 361, 362, 363, 370, 375, 420

MATHEMATICS

MA 111, 112, 140, 142, 145, 211, 222, 241, 242, 243

COMPUTER SCIENCE

IT 109, CS 118, BA 120

PHYSICAL AND LIFE SCIENCES

PS 101-109, 142, 302, 304, 308, 309

HUMANITIES

LOWER-LEVEL:
HU 140s series, 250
UPPER-LEVEL:
HU 300-315, 320-345

SOCIAL SCIENCES

LOWER-LEVEL:
PSY 220 (required) and 3 credits from the following: EC 200-211, SS 110-130, 204, 210
UPPER LEVEL: SS 302-361

CORE REQUIREMENTS**

COLLEGE SUCCESS

UNIV 101

Total Credits **1**

ADVANCED COMMUNICATION

(For the Advanced Communication requirement, Human Factors majors are required to take two Advanced Communication classes for a total of six credits. This exists in addition to the nine credits (three classes) taken for the Communication General Education Requirement.)

COM 360, 364, 410, 411, 415, 460
HU 361, 362, 363, 375, 415, 420

Total Credits **6**

COMPUTER SCIENCE/MATHEMATICS

(Six credit hours from MA or CS courses listed below. These courses are in addition to those taken as General Education.)

MA 140, 142, 241-243, 320, 412
(other courses with approval of advisor) -OR-
CEC 220, 222
CS 118, 125, 223, 225
IT All courses in the curriculum may be used.

Total Credits **6**

PSYCHOLOGY AND HUMAN FACTORS

‡Course		Title	Credits
HF	300	Human Factors I: Principles and Fundamentals	3
HF	302	Human Factors II: Analytic Methods and Techniques	3
HF	305	Human Factors III: Ergonomics and Bioengineering	3
HF	400	Human Factors IV: System Design	3
PSY	225	Research Analysis in Psychology	4
PSY	300	Research Design in Psychology	3
PSY	305	Experimental Psychology	3
PSY	310	Sensation and Perception	3
PSY	315	Cognitive Psychology	3
PSY	335	Physiological Psychology	3

Total Credits **31**

AVIATION

Course		Title	Credits
AS	120	Principles of Aeronautical Science -OR-	
SP	110	Introduction to Space Flight -OR-	
FAA		Private Pilot Certificate	

Total Credits **3**

PRACTICUM

Course		Title	Credits
HF	490	Practicum in Human Factors Psychology	3

Total Core Credits **50**

‡All Psychology and Human Factors courses in this group must be passed with a "C" or better to count toward degree completion.

SPECIFIED ELECTIVES

Take two courses from the following three sets of courses (18 credit hours total).

Group I: Human and Machine Cognition

Course		Title	Credits
HF	310	Human-Computer Interaction	3
HF	315	Automation and Systems Issues in Aviation	3
HF	405	System Performance Modeling	3
HF	415	Human Factors in Simulation Systems	3
HF	420	Advanced Topics in Human-Computer Interaction	3
HF	425	Human Factors in Computer Systems Design	3

Group II: Applied Systems in Human Factors

Course		Title	Credits
HF	325	Human Factors and System Safety	3
HF	330	Human Factors in Space	3
HF	335	Human Factors in Air Traffic Control	3
HF	340	Human Factors and Product Liability	3
HF	345	Human Factors Issues in Lifespan Development	3
HF	410	Human Factors Engineering: Crew Station Design	3

Group III: Psychological Foundations of Human Factors

Course		Title	Credits
HF	320	Processes Underlying Crew Resource Management	3
HF	430	Tests and Measurements	3
PSY	320	Aviation Psychology	3
PSY	325	Group Structure and Process	3
PSY	330	Learning and Motivation	3
PSY	340	Industrial-Organizational Psychology	3
PSY	345	Training and Development	3
PSY	350	Social Psychology	3
PSY	400	Introduction to Cognitive Science	3

(Other courses with approval of advisor.)

Open Elective Credits	**18**
Total Elective Credits	**36**
TOTAL DEGREE CREDITS	**122**

Suggested Program of Study

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Computer Science*	3
		Lower-Level Humanities*	3
		Mathematics*	6
		Physical and Life Sciences*	3
HF	300	Human Factors I: Principles and Fundamentals	3
HU		HU/PSY/SS 300-400 level*	3
PSY	220	Intro to Psychology*	3
UNIV	101	College Success	1
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Lower-Level Social Sciences*	3
		Physical and Life Sciences*	3
CS/MA		Computer Science/Math**	3
HF	302	Human Factors II: Analytic Methods and Techniques	3
HU		Advanced Communication**	6
PSY	225	Research Analysis in Psychology	4
PSY	300	Research Design in Psychology	3
AS	120	Principles of Aeronautical Science -OR-	
SP	110	Introduction to Space Flight -OR-	
FAA		Private Pilot Certificate	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
CS/MA		Computer Science/Math**	3
HF	305	Human Factors III: Ergonomics and Bioengineering	3
HF	490	Practicum in Human Factors Psychology	3
HF/PSY		Specified Electives	6
PSY	305	Experimental Psychology	3
PSY	310	Sensation and Perception	3
PSY	315	Cognitive Psychology	3
PSY	335	Physiological Psychology	3
		Open Electives	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
HF	400	Human Factors IV: System Design	3
HF/PSY		Specified Electives	12
		Open Electives	15
Total Credits			**30**

TOTAL DEGREE CREDITS **122**

* General Education Requirement

** Degree Core Requirement

Academic Programs at the Daytona Beach Campus

Human Factors Psychology/ Master of Human Factors and Systems

Bachelor of Science

Master of Human Factors and Systems

In conjunction with the Bachelor of Science in Human Factors Psychology and the traditional master degree in Human Factors and Systems, the Department of Human Factors and Systems also offers a five-year master degree program in Human Factors and Systems. The five-year master program offers upper-level undergraduates in the major the chance to begin their graduate work while completing their bachelor degree program. The program is open to all undergraduate Human Factors students who meet eligibility requirements that include a CGPA of 3.20 and junior-year standing. Student applications will be reviewed for the program and students accepted into the five-year master program will be notified of such at the end of their junior year. During their senior undergraduate year, they will take two graduate classes (six credits) that will fulfill requirements for both the bachelor and the master degree program. Five-year master students are required to complete 30 credits of graduate work to complete the degree program. Both the Bachelor of Science degree in Human Factors Psychology and the master degree in Human Factors and Systems will be awarded when the student completes the master degree program.

General Education

Course*	Credits
Communication Theory and Skills	9
Mathematics	6
Computer Science	3
Physical and Life Sciences (One course must include a laboratory)	6
Lower-Level Humanities	3
Lower-Level Social Sciences	6
HU/SS/PSY 300-400 level	3
Total Credits	**36**

Embry-Riddle courses in general education may be chosen from those listed below, assuming prerequisites are met. Courses from other institutions are acceptable if they fall into these broad categories.

<u>Communication Theory and Skills</u>
COM 122, 219, 221, 222, 351, 360, 364, 410, 411, 412
HU 143, 319, 351, 355, 361, 362, 363, 370, 375, 420

<u>Mathematics</u>
MA 111, 112, 140, 142, 145, 211, 222, 241, 242, 243

<u>Computer Science</u>
IT 109, CS 118, BA 120

<u>Physical and Life Sciences</u>
PS 101-109, 142, 302, 304, 308, 309

<u>Humanities</u>
LOWER-LEVEL:
HU 140s series, 250
UPPER-LEVEL:
HU 300-315, 320-345

<u>Social Sciences</u>
LOWER-LEVEL:
PSY 220 (required) and 3 credits from the following: EC 200-211, SS 110-130, 204, 210
UPPER-LEVEL: SS 302-360

Core Requirements **

<u>College Success</u>
UNIV 101 1

<u>Advanced Communication</u>
For the Advanced Communication requirement, Human Factors majors are required to take two Advanced Communication classes for a total of six credits.

This is in addition to the nine credits (three classes) taken for the Communication General Education Requirement.

COM 360, 364, 410, 411, 415, 460
HU 361, 362, 363, 375, 415, 420

Total Credits 6

Computer Science/Mathematics

Six credit hours from MA or CS courses listed below. These courses are in addition to those taken as General Education.

MA 140, 142, 241-243, 320, 412
(other courses with approval of advisor) -OR-
CEC 220, 222
CS 118, 125, 223, 225
IT All courses in the curriculum may be used.

Total Credits 6

Psychology and Human Factors

‡Course		Title	Credits
HF	300	Human Factors I: Principles and Fundamentals	3
HF	302	Human Factors II: Analytic Methods and Techniques	3
HF	305	Human Factors III: Ergonomics and Bioengineering	3
HF	400	Human Factors IV: System Design	3
PSY	225	Research Analysis in Psychology	4
PSY	300	Research Design in Psychology	3
PSY	305	Experimental Psychology	3
PSY	310	Sensation and Perception	3
PSY	315	Cognitive Psychology	3
PSY	335	Physiological Psychology	3

Total Credits 31

Aviation

Course		Title	Credits
AS	120	Principles of Aeronautical Science -OR-	
SP	110	Introduction to Space Flight -OR-	
FAA		Private Pilot Certificate	3

Practicum

Course		Title	Credits
HF	490	Practicum in Human Factors Psychology	3

‡All Psychology and Human Factors courses in this group must be passed with a "C" or better to count toward degree completion.

Specified Electives

Take two courses from the following three sets of courses (18 credit hours total).

Group I Human and Machine Cognition

Course		Title	Credits
HF	310	Human-Computer Interaction	3
HF	315	Automation and Systems Issues in Aviation	3
HF	405	System Performance Modeling	3
HF	415	Human Factors in Simulation Systems	3
HF	420	Advanced Topics in Human-Computer Interaction	3
HF	425	Human Factors in Computer Systems Design	3

Group II: Applied Systems in Human Factors

Course		Title	Credits
HF	325	Human Factors and System Safety	3
HF	330	Human Factors in Space	3
HF	335	Human Factors in Air Traffic Control	3
HF	340	Human Factors and Product Liability	3
HF	345	Human Factors Issues in Lifespan Development	3
HF	410	Human Factors Engineering: Crew Station Design	3

Group III: Psychological Foundations of Human Factors

Course		Title	Credits
HF	320	Processes Underlying Crew Resource Management	3
HF	430	Tests and Measurements	3
PSY	320	Aviation Psychology	3
PSY	325	Group Structure and Process	3
PSY	330	Learning and Motivation	3
PSY	340	Industrial-Organizational Psychology	3
PSY	345	Training and Development	3
PSY	350	Social Psychology	3
PSY	400	Introduction to Cognitive Science	3

(Other courses with approval of advisor)

Total Credits 18

Open Electives 15

Graduate Specified Electives

Course		Title	Credits
HFS	500	Systems Concepts	3
HFS	510	Research Design and Analysis I	3
HFS	610	Research Design and Analysis II	3
HFS	615	Sensation and Perception	3

HFS	620	Memory and Cognition	3
HFS	700	Thesis	6
HFS		Graduate Elective***	12
Total Credits			**33**
TOTAL DEGREE CREDITS			**152**

Suggested Program of Study

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

FRESHMAN YEAR

Course		Title	Credits
UNIV	101	College Success	1
		Communication Theory and Skills*	6
		Computer Science*	3
		Lower-Level Humanities*	3
		HU/PSY/SS 300-400 level*	3
		Mathematics*	6
		Physical and Life Sciences*	3
HF	300	Human Factors I: Principles and Fundamentals	3
PSY	220	Introduction to Psychology*	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
AS	120	Principles of Aeronautical Science -OR-	
SP	110	Introduction to Space Flight -OR- Communication Theory and Skills*	3
		Lower-Level Social Sciences*	3
		Physical and Life Sciences*	3
		Computer Science/Math**	3
FAA		Private Pilot Certificate	3
HF	302	Human Factors II: Analytic Methods and Techniques	3
HU		Advanced Communication**	6
PSY	225	Research Analysis in Psychology	4
PSY	300	Research Design in Psychology	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
		Computer Science/Math**	3
HF	305	Human Factors III: Ergonomics and Bioengineering	3
HF/PSY		Specified Electives	9
PSY	305	Experimental Psychology	3
PSY	310	Sensation and Perception	3
PSY	315	Cognitive Psychology	3
PSY	335	Physiological Psychology	3
		Open Elective	3
Total Credits			**30**

SUMMER TERM

Course		Title	Credits
HF	490	Practicum in Human Factors Technology	3

Students must spend the term performing a co-op engaged in a human factors engineering activity (analysis, design, or test).

SENIOR YEAR

Course		Title	Credits
HF	400	Human Factors IV: System Design	3
HFS	500	Systems Concepts	3
HFS	620	Memory and Cognition	3
HF/PSY		Specified Electives	9
		Undergraduate Open Electives	12
Total Credits			**30**

GRADUATE-LEVEL STUDIES

Course		Title	Credits
HFS	510	Research Design and Analysis I	3
HFS	610	Research Design and Analysis II	3
HFS	615	Sensation and Perception	3
HFS	700	Thesis	6
HFS		Graduate Elective***	12
Total Credits			**27**
TOTAL DEGREE CREDITS			**152**

* General Education Requirement

** Degree Core Requirement

*** Please refer to the Graduate Catalog for a listing of available graduate-level Electives.

Space Physics

Bachelor of Science

The Bachelor of Science in Space Physics, offered on the Daytona Beach campus, is designed to produce graduates who want to pursue careers in space-related professions or who want to pursue advanced studies in diverse areas of science and engineering. This program supports the University's purpose "to provide a comprehensive education to prepare graduates for productive careers and responsible citizenship with special emphasis on the needs of aviation, aerospace engineering, and related fields."

As defined by NASA, "Space Physics is the scientific study of magnetic and electric phenomena that occur in outer space, in the upper atmosphere of planets, and on the Sun. Space physicists use ground based instruments, balloons, rockets, satellites, and deep space probes to study these phenomena where they occur." Examples of such studies include space shuttle aurora observations, ground-based solar studies, ground-based ionospheric studies, balloon flights to the edge of the atmosphere, and sounding rocket flights into near space.

The Space Physics program focuses on Space Science with emphasis on solar system physics, planetary science, and astrophysics. The program shares its facilities and coursework with the highly successful Engineering Physics program, the largest of its kind in the United States.

Admission Requirements

To enter this program, students must have completed four years of high school science and mathematics, demonstrating a high level of competency. Successful candidates for this program will be prepared to enter Calculus I and Chemistry for Engineers.

Degree Requirements

The Bachelor of Science in Space Physics degree program requires 120 credit hours. The program can be completed in eight semesters. The courses necessary to earn this degree are listed below. Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing. A grade of C or better is required in MA 241, MA 242, MA 243, PS 208, PS 215, and PS 219.

FRESHMAN YEAR

Course	Title	Credits
EP 101	Current Topics in Space Sciences	1
	Communication Theory and Skills*	6
	Lower-Level Humanities*	3
	Lower-Level Social Sciences*	3
MA 241	Calculus & Analytic Geometry I	4
MA 242	Calculus & Analytic Geometry II	4
PS 140	Chemistry for Engineers	4
PS 141	Chemistry for Engineers Laboratory	1
PS 215	Physics I	3
PS 216	Physics Laboratory I	1
Total Credits		**30**

Academic Programs at the Daytona Beach Campus

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Upper-Level Humanities*	3
EGR	115	Introduction to Computing for Engineers	3
MA	243	Calculus & Analytic Geometry III	
MA	345	Differential Equations and Matrix Methods	4
PS	208	Physics II	3
PS	219	Physics III	3
PS	220	Physics Laboratory III	1
		Open Electives	6
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
		Technical Elective	3
EP	393	Spaceflight Dynamics	2
EP	400	Thermodynamics and Statistical Mech.	3
MA	441	Advanced Engineering Mathematics I	3
MA	442	Advanced Engineering Mathematics II	3
		Upper-Level Social Sciences*	3
PS	303	Modern Physics	3
PS	305	Modern Physics Laboratory	1
PS	320	Classical Mechanics	3
PS	401	Astrophysics	3
		Open Elective	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
		Technical Electives	6
EP	410	Space Physics	3
EP	420	Planetary Science	3
EP	440	Engineering Electricity and Magnetism	3
EP	455	Quantum Physics	3
PS	400	Senior Physics Laboratory	3
PS	405	Atomic/Nuclear Physics	3
PS	408	Astrophysics II	3
		Open Elective	3
Total Credits			**30**
TOTAL DEGREE CREDITS			**120**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities and Social Sciences, and the Technical Electives may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified in the Space Physics vertical outline.

COMMUNICATION THEORY AND SKILLS

COM 122, 219, 221, 222, 351, 360

HUMANITIES

LOWER-LEVEL:
HU 140-146, 250
UPPER-LEVEL:
HU 300-400 level

SOCIAL SCIENCES

LOWER-LEVEL:
EC 200,
PSY 220, SS 110, 120, 130, 204, 210
UPPER-LEVEL:
HF 300
PSY 350,
SS 302, 305, 310, 320, 325, 331, 335, 340, 350, 352, 360

TECHNICAL ELECTIVES

AE/CEC/CIV/CS/EP/MA/PS 300-400 level

Students may take other HU/SS courses with the approval of the department chair/program coordinator.

Academic Programs at the Daytona Beach Campus

College of Aviation

Dr. Tim Brady, Dean

The College of Aviation integrates into one unit the departments of Aeronautical Science, Aviation Maintenance Science, Applied Aviation Sciences, and the Flight Training Department, which is the flight laboratory component for the Aeronautical Science degree. This cohesive unit takes advantage of the various talents and expertise of faculty and staff in these related programs. By having these programs in one complex composed of the Aviation Building, the Simulation Center, the Flight Laboratory, and the Maintenance complex, the College provides an atmosphere in which students are able to immerse themselves in an environment designed to provide them with the best resources available for the highest quality degree possible.

The Aviation Building, a strikingly beautiful state-of-the-art facility that opened in 2002, houses the academic departments, classrooms, and laboratories, including the Air Traffic Simulation laboratory, which provides a unique experience for students in various curricula. The Simulation Center contains the most advanced ab-initio aircraft simulation devices on the planet: aircraft-specific Cessna 172 and Piper Seminole flight training devices (FTD), plus a CRJ FTD. Each of these devices exactly simulates the aircraft, including the flying qualities, sounds, etc., and each has powerful, realistic visuals.

The College of Aviation complex also serves as a living laboratory that can research all elements of an air transportation system, including dynamic modeling of air traffic control interfaces, security systems, and safety systems through its highly sophisticated aircraft and air traffic simulation laboratories. These simulations can then be incorporated into the real world, where a fleet of airplanes can bring the simulation scenarios to life in an actual in-flight laboratory.

Academic degree programs offered through the College of Aviation include the following undergraduate degrees:

- Aeronautical Science (Professional Pilot)
- Aeronautics
- Aviation Maintenance Science
- Aerospace Electronics
- Applied Meteorology
- Air Traffic Management
- Homeland Security
- Safety Science

In addition, the College offers the Master of Science degree in Aeronautics with specializations in Aerospace Education, Aerospace Management, Aviation Operations, Aviation Safety Systems, and Human Factors.

The College of Aviation has an enrollment of approximately 2,100 students, many of whom are in the Aeronautical Science degree, which has the largest enrollment of any similar undergraduate degree program in the nation. The College has a fleet of 61 aircraft, including Cessna C-172s, Piper PA-28R Arrows, and Piper PA-44 Seminoles.

Embry-Riddle has positioned the College of Aviation to serve its students with distinction while investigating and developing new education and programs for pilots, air traffic managers, meteorologists, and safety and security professionals of the new century.

Academic Programs at the Daytona Beach Campus

Aeronautical Science (Professional Pilot)

Bachelor of Science
Specialties: Airline Pilot, Commercial Pilot, Military Pilot

The Aeronautical Science degree program blends flight training with rigorous academic study in a unique manner that provides a strong foundation for a career as a leader in the aviation industry, including airlines, corporate and commercial aviation, or the military. This approach to aviation education gives the studentadded value over traditional flight training programs by focusing on the skills and knowledge required by today's industry. The curriculum provides skills in mathematics, physics, communications, and aeronautics, including FAA certification as a multi-engine instrument rated commercial pilot. The last two years of matriculation include extensive professional-level Aeronautical Science and flight courses that prepare the graduate for a career as a professional pilot, including airline flight crew operations in multi-crewmember jet transport aircraft. Critical thinking and problem-solving skills are developed via computer simulations in aircraft performance, navigation, and aircraft systems operation. Effective resource management, human factors, and safety awareness are constantly emphasized throughout the curriculum.

Degree Requirements

The Bachelor of Science degree in Aeronautical Science may be attained in eight semesters. To earn the degree, successful completion of a minimum of 120 credit hours is required. The purpose of the Aeronautical Science degree program is to prepare the graduate for a productive career as a professional pilot and for responsible citizenship in support of aviation and aerospace industries. Upon completion of the curriculum, the student will possess an FAA Commercial Pilot Certificate with multi-engine and instrument ratings. Optional advanced flight training includes upset training, certification as a flight instructor and instrument flight instructor, and training as a flight crewmember in a jet transport aircraft.

Students pursuing the Aeronautical Science degree will select one of three specializations after matriculation. Students entering under this catalog may select from the Airline Pilot, Commercial Pilot, or Military Pilot specialization. Please see the section concerning the restrictions imposed by the Aviation Transportation and Security Act. All students must complete the general education courses, the Aeronautical Science core courses, and the courses required to complete one specialization in order to complete the requirements for the Aeronautical Science degree.

Academic Programs at the Daytona Beach Campus

Bachelor of Science Degree in Aeronautical Science

	Credits
General Education	39
Aeronautical Science Core	55
Specialty Courses	26
Total Degree Credits	**120**

University General Education

Course		Title	Credits
		Communication Theory and Skills*	9
		Lower-Level Humanities*	3
		Lower-Level Social Sciences*	6
		Upper-Level Humanities -OR- Social Sciences*	3
		Computer Science Elective*	3
		Management Elective*	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
PS	104	Technical Physics II with Laboratory	3
Total Credits			**39**

Aeronautical Science Core Courses

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
AS	232	Intermediate Aeronautics	3
AS	272	Advanced Aeronautics	2
AS	309	Aerodynamics	3
AS	310	Aircraft Performance	3
AS	311	Aircraft Engines-Turbine	3
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	356	Systems and Components	3
AS	357	Flight Physiology	3
AS	358	Advanced Avionics	3
AS	350	Domestic and International Navigation	3
AS	387	Crew Resource Management	3
AS	408	Flight Safety	3
AS	420	Flight Technique Analysis	3
FA	132	Commercial Pilot Flight I**	1
FA	133	Commercial Pilot Flight II**	1
FA	232	Commercial Pilot Flight III**	1
FA	272	Commercial Pilot Flight IV**	1
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**54**

Airline Pilot Specialty

Course		Title	Credits
AS	254	Aviation Legislations -OR-	
AS	405	Aviation Law	3
AS	380	Pilot Career Planning and Interviewing	1
AS	402	Airline Operations -OR-	
AS	410	Airline Dispatch Operations	3
AS	411	Jet Transport Systems	3
AS	435	Electronic Flight Management Systems	3
FA	420	Airline Flight Crew Techniques and Procedures	2
		Electives	12
Total Credits			**27**

Commercial Pilot Specialty

Course		Title	Credits
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	380	Pilot Career Planning and Interviewing	1
BA/STG		300/400 level	3
		Minor	9-18
		Electives	2-11
Total Credits			**27**

Military Pilot Specialty

Course		Title	Credits
AS	435	Electronic Flight Management Systems	3
SS	305	American Military History -OR-	
SS	340	American Foreign Policy	3
		ROTC	16
		Electives	5
Total Credits			**27**
Total Degree Credits			**120**

Academic Programs at the Daytona Beach Campus

Suggested Program of Study

Airline Pilot Specialty

The Airline Pilot Specialty is designed for students whose goal is to fly for a scheduled airline. The academic and flight courses are designed to provide exposure to procedures and operations consistent with those found at air carriers. The upper-level AS courses are very technical and provide the foundation for the capstone flight courses that are designed to be consistent with current airline transport pilot requirements.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Computer Science Elective*	3
		Lower-Level Humanities*	3
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
FA	132	Commercial Pilot Flight I**	1
FA	133	Commercial Pilot Flight II**	1
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
WX	201	Meteorology I	3
Total Credits			**29**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Social Sciences*	6
		Management Elective*	3
AS	232	Intermediate Aeronautics	3
AS	309	Aerodynamics	3
AS	357	Flight Physiology	3
FA	232	Commercial Pilot Flight III**	1
PS	104	Technical Physics II with Laboratory	3
WX	352	Meteorology II	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
		Upper-Level HU/SS Elective*	3
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	272	Advanced Aeronautics	2
AS	310	Aircraft Performance	3
AS	311	Aircraft Engines-Turbine	3
AS	356	Aircraft Systems and Components	3
AS	358	Advanced Avionics	3
AS	380	Pilot Career Planning and Interviewing Techniques	1
AS	350	Domestic and International Navigation	3
FA	272	Commercial Pilot Flight IV**	1
		Electives	3
Total Credits			**28**

SENIOR YEAR

Course		Title	Credits
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	387	Crew Resource Management	3
AS	402	Airline Operations -OR-	
AS	410	Airline Dispatch Operations	3
AS	408	Flight Safety	3
AS	411	Jet Transport Systems	3
AS	420	Flight Technique Analysis	3
AS	435	Electronic Flight Management Systems	3
FA	420	Airline Flight Crew Techniques and Procedures	2
		Electives	9
Total Credits			**32**

TOTAL DEGREE CREDITS **120**

Commercial Pilot Specialty

The Commercial Pilot Specialty is designed for pilots with career interests requiring a more flexible degree program. The Aeronautical Science core course integrity is maintained, while allowing greater opportunity for the selection of courses to meet the needs of corporate and other segments of the aviation industry not specifically addressed by the Airline Pilot or Military Pilot specialties. One minor must be completed to meet the degree requirements of this specialization.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Computer Science Elective*	3
		Lower-Level Humanities*	3
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
FA	132	Commercial Pilot Flight I**	1
FA	133	Commercial Pilot Flight II**	1
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3

PS	103	Technical Physics I with Laboratory	3
WX	201	Meteorology	3
Total Credits			**29**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Social Sciences*	6
		Management Elective*	3
AS	232	Intermediate Aeronautics	3
AS	309	Aerodynamics	3
AS	357	Flight Physiology	3
FA	232	Commercial Pilot Flight III**	1
PS	104	Technical Physics II with Laboratory	3
WX	352	Meteorology II	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
		Upper-Level HU/SS Elective*	3
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	272	Advanced Aeronautics	2
AS	310	Aircraft Performance	3
AS	311	Aircraft Engines-Turbine	3
AS	356	Aircraft Systems and Components	3
AS	358	Advanced Avionics	3
AS	380	Pilot Career Planning and Interviewing Techniques	1
AS	350	Domestic and International Navigation	3
AS	387	Crew Resource Management	3
FA	272	Commercial Pilot IV**	1
Total Credits			**28**

SENIOR YEAR

Course		Title	Credits
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	408	Flight Safety	3
AS	420	Flight Technique Analysis	3
BA/STG		300/400 Level	3
		Minor	9-18
		Electives	2-11
Total Credits			**31**

Total Degree Credits **120**

Military Pilot Specialty

The Military Pilot Specialty is designed for pilots with career interests in the military. This specialty contains the core Aeronautical Science courses and includes other courses optimized for a career as a pilot with the military. The Aeronautical Science degree, Military Pilot Specialty is not a part of any ROTC program at Embry-Riddle but is designed for optimum use of the credit earned in ROTC.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Computer Science Elective*	3
		Lower-Level Humanities*	3
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
FA	132	Commercial Pilot I**	1
FA	133	Commercial Pilot II**	1
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
WX	201	Meteorology I	3
		ROTC	2
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Social Sciences*	6
AS	232	Intermediate Aeronautics	3
AS	309	Aerodynamics	3
AS	357	Flight Physiology	3
FA	232	Commercial Pilot Flight III**	1
PS	104	Technical Physics II with Laboratory	3
WX	352	Meteorology II	3
		ROTC	2
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
		Management Elective*	3
AS	272	Advanced Aeronautics	2
AS	310	Aircraft Performance	3
AS	311	Aircraft Turbine Engines	3
AS	356	Aircraft Systems and Components	3
AS	358	Advanced Avionics	3
AS	350	Domestic and International Navigation	3
AS	387	Crew Resource Management	3
FA	272	Commercial Pilot IV**	1
		ROTC	6
Total Credits			**30**

Academic Programs at the Daytona Beach Campus

SENIOR YEAR

Course		Title	Credits
		Upper-Level HU/SS Elective*	3
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	408	Flight Safety	3
AS	420	Flight Technique Analysis	3
AS	435	Electronic Flight Management Systems	3
SS	305	American Military History -OR-	
SS	340	American Foreign Policy	3
		Electives	5
		ROTC	6
Total Credits			**29**
TOTAL DEGREE CREDITS			**120**

AERONAUTICAL SCIENCE NOTES

*Embry-Riddle courses in the general education categories of Communication Theory and Skills, Computer Science, Humanities, Social Sciences, and Management may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified in the Aeronautical Science vertical outline.

Communication Theory and Skills:
COM 122, 219, and 221, 222, or 410

Computer Science:
IT 109 or CS 117 or 118

Humanities/Social Sciences:
LOWER-LEVEL: HU 140, 141, 142, 143, 144, 145, 146
LOWER-LEVEL: PSY 220 and EC 200, SS 110, 120, 130, 204 or 210
(Military Pilot Specialty may take only PSY 220 and SS 110, 120, or 130.)
UPPER-LEVEL: HU/SS 300-400 level or HF 300 or PSY 50

Management:
BA 201

**Flight education is a continuous process that normally begins sometime during the student's first year of attendance and will progress until culminating in a multi-engine commercial certificate with an instrument rating. The curriculum is designed to allow students to meet core objectives in a reasonable amount of time.

Various factors influence students' progress. These factors include student academic preparation, student availability, student determination and dedication, the availability of aircraft and instructor pilots, and the co-operation of the weather. Consequently, some students will finish before others. After completing the core curriculum, students may take an additional semester or more to acquire additional advanced certificates and ratings, including those for single-engine commercial, certified flight instructor airplane and instrument and/or they may enroll in the Airline Flight Crew Simulation course.

Refer to page 36 for credit for flight training at other institutions.

Cooperative Education credits may be used as open electives.

Academic Programs at the Daytona Beach Campus

Aircraft Dispatcher Certification Program

For the student interested in airline flight operations management, Embry-Riddle offers a program to prepare the student for Aircraft Dispatcher certification testing. The FAA awards the Aircraft Dispatcher Airman Certificate to graduates of the approved program after the successful completion of a standardized written examination and a practical test.

Licensed dispatchers are employed by airlines to manage the ground-based tasks vital to a successful airline flight. Dispatchers share responsibility with the captain for preflight planning and preparation of the dispatch release, and they are included in the decision loop on equipment failures, weather variations, or traffic delays for monitoring the progress of the flight, issuing safety-of-flight information to the crew, and canceling or redispatching the flight.

To carry out these tasks properly, dispatchers must be knowledgeable in aircraft performance capabilities, meteorology, operating regulations, air traffic control, and instrument flight procedures. They must also be able to make sound decisions that incorporate the company's economic and scheduling considerations

Certification Requirements

The Aircraft Dispatcher Certification program is available at the Daytona Beach campus. Dispatcher preparation is based on the successful completion of the following Aeronautical Science courses and the applicable prerequisites.

Course	Title	Credits
AS 232	Intermediate Aeronautics	3
AS 272	Advanced Aeronautics	2
AS 310	Aircraft Performance	3
AS 410	Airline Dispatch Operations.*	3
AT 300	ATC in the National Aerospace System	3
WX 201	Meteorology I	3
WX 352	Meteorology II	3
Total Credits		**20**

* AS 410 serves as the capstone course for the Aircraft Dispatcher program. Students cannot enroll in this class until they have completed and passed all other required Aeronautical Science courses for the Aircraft Dispatcher Program. Students must be 21 years of age to take this examination.

This program is offered in the pursuit of a degree and not as separate training. Qualification for FAA testing normally requires a minimum of six semesters of instruction. To receive credit for any of the courses listed above toward the Aircraft Dispatcher certification program, the student must sign up in each required course, maintain a record of 100 percent attendance throughout each course, and obtain a grade of at least 70 percent. For more information, contact the Aeronautical Science Department.

Academic Programs at the Daytona Beach Campus

Aviation Maintenance Science

Bachelor of Science

At the heart of every flight of every commercial, private, or military aircraft is the work of the professional aviation maintenance expert. Without the devotion of these very special people, the air travel system would cease to function. The demand for degreed aircraft maintenance specialists in the aviation/aerospace world has never been greater than it is today. The Aviation Maintenance Science (AMS) program at Embry-Riddle produces these aviation professionals, the best in the world.

The Aviation Maintenance Science degree is composed of 120 credit hours, which includes credit for the Airframe and Powerplant (A&P) certification. The degree has several options called areas of concentration (AOC). You can choose AOCs in Maintenance Management, Aerospace Electronics, Flight, or Information Technology. The chart below shows a distribution of the credits for each of those AOCs.

The Maintenance Management AOC is optimized for those who wish to use their maintenance skills as a platform for advancing into a management position in one of the many aviation maintenance environments. The Flight AOC is for those students who wish to combine a maintenance background with the qualifications of a commercial pilot. The Information Technology AOC is designed for the student who is interested in the application of computer technology to aviation technical support operations. The Aerospace Electronics AOC is for students who have an interest in combining their aerospace electronics skills with the A&P certificate or a minor course of study that supports their career objectives. The Maintenance Management area of concentration and the Aerospace Electronics area of concentration are accred-

	Maintenance Management	Aerospace Electronics	Flight	Information Technology
General Education Core	36	36	36	36
Common Core	12	12	12	12
Area of Concentration	42	47	42	42
A&P Certification[1]	24	*	24	24
Open Electives[2]	6	*	6	6
Total	120	120	120	120

1 Forty-eight hours of credit will be awarded for the A&P certification and entered on the student's transcript. Up to 24 of those credit hours may be applied toward this degree.
2 Open electives must be taken at the 300-400 level for some AOCs to meet the upper-level requirement.

* Any minor or the A&P certification can be used to satisfy this requirement for the Aerospace Electronics track only. The balance of the credit hours are to be used as electives. A total of 40 upper-level credits are required to meet graduation requirements.

ited by Aviation Accreditation Board International (AABI, formerly Council on Aviation Accreditation), 3410 Skyway Drive, Auburn, AL 86830, telephone: (334)-844-2431.

The A&P certification is required for graduation from the program in all the areas of concentration except Aerospace Electronics. The Aerospace Electronics AOC allows the student to complete a minor course of study in place of the A&P certification.

The courses taken in the Aviation Maintenance Science Department lead to a student being approved for the A&P certification exams. Credit will be granted for any student who enters the University already in possession of the A&P certification.

International certification, which may be equivalent to the Airframe and Powerplant certification, will be evaluated on a case-by-case basis and, if approved, may be used for academic credit.

General Education Core

Course		Title	Credits
COM	122	English Composition & Literature	3
COM	XXX*		6
IT	109	Introduction to Computers and Applications	
		- OR -	
EGR	115	Introduction to Computing for Engineers**	
		- OR -	
CS	223	Scientific Programming in C**	3
HU		Lower-Level Humanities	3
HU/SS		Upper-Level Humanities or Social Sciences	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I	3
PS	104	Technical Physics II	3
PSY	220	Intro to Psychology	3
		Lower-Level SS Elective	3
Total Credits			**36**

* The recommended courses are COM 219 and COM 221

** The Aerospace Electronics AOC requires EGR 115 or CS 223

Common Core Curriculum

Course		Title	Credits
BA	201	Principles of Management	3
SF	201	Introduction to Health, Occupational, and Transportation Safety	3

Students must also choose two courses from the following list, adding up to at least six credits.

AMS	380	Radio Communication Theory and Application	2
AMS	384	General Aviation Avionics Systems Integration	4
AMS	388	Air Transport Avionics Systems Line Maintenance	6
AS	3XX OR 4XX		3
AT	3XX OR 4XX		3
BA	3XX OR 4XX		3
FA	3XX OR 4XX		3
HF	3XX OR 4XX		3
SF	3XX OR 4XX		3
WX	3XX OR 4XX		3
Total Credits			**12**

Aviation Maintenance Science Courses (leading to A&P certification)

Course		Title	Credits
AMS	101	Maintenance Mathematics and Physics	2
AMS	102	Aircraft Familiarization	2
AMS	103	Tools, Materials, and Processes	2
AMS	111	Regulations, Documentation, and Drawing	3
AMS	112	Fundamentals of Electricity	3
AMS	121	Electrical Power Systems I	2
AMS	122	Metallic Structures	2
AMS	123	Instruments and Avionics	2
AMS	131	Composite Materials and Processes	2
AMS	132	Aircraft Systems I	2
AMS	133	Aircraft Systems II	2
AMS	241	Classic Structures	2
AMS	242	Airframe Maintenance Practices	2
AMS	243	Electrical Power Systems II	2
AMS	251	Introduction to Powerplants	2
AMS	252	Fuel, Air, and Exhaust Systems	2
AMS	253	Powerplant Electrical Systems	2
AMS	361	Turbine Engines	3
AMS	362	Propeller Systems	3
AMS	371	Powerplant Inspection and Line Maint.	3

Academic Programs at the Daytona Beach Campus

AMS 372	Engine Maintenance, Repair, and Overhaul	3
Total Credits		**48**
Total Credits Toward Degree		**24**

The courses listed are required in order to qualify for the FAA Airframe and Powerplant certification. The A&P certification is a requirement for degree completion. A total of 24 credit hours will be granted toward the degree program. All 48 credit hours will appear on the student's transcript. Tuition for the AMS courses is less than for the other courses in the degree, and is billed separately from the University block tuition. Contact the AMS program coordinator for additional information.

Maintenance Management Area of Concentration

Course		Title	Credits
BA	210	Financial Accounting	3
BA	221	Advanced Computer Based Systems	3
BA	311	Marketing	3
BA	312	Managerial Accounting	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	324	Aviation Labor Relations	3
BA	325	Social Responsibility and Ethics in Management	3
BA	390	Business Law	3
BA	419	Aviation Maintenance Management	3
BA	420	Management of Production and Operations	3
BA	422	Life Cycle Analysis for Systems and Programs in Aviation/Aerospace	3
BA	424	Project Management in Aviation Ops	3
MA	222	Business Statistics	3
		Open Electives	6
Total Credits			**48**

Aerospace Electronics Area of Concentration

Course		Title	Credits
AEL	311	Airborne Pulse Systems	3
AEL	312	Airborne Communications and Navigation Systems	3
AEL	313	Airborne Electronics Maintenance Operations	2
AEL	401	Airborne Surveillance Systems	3
AEL	402	Airborne Electronics Systems Integration	3
AEL	403	Advanced Space and Airborne Electronics Systems	3
AEL	404	Airborne Electronics Maintenance Operations II	2
EGR	120	Engineering Drawing	2
EL	107	Direct and Alternating Current Fundamentals and Circuit Analysis	4
EL	108	Direct and Alternating Current Laboratory	1
EL	203	Microelectronics Fundamentals and Circuit Analysis	4
EL	204	Microelectronics Laboratory	1
EL	212	Digital Circuit and Systems Analysis	4
EL	213	Digital Circuits Laboratory	1
EL	301	Electronic Communication Systems	3
EL	302	Electronic Communications Laboratory	1
EL	303	Pulse Components and Circuit Applications	2
EL	304	Pulse Circuits Laboratory	1
EL	307	Microprocessor Systems	3
EL	308	Microprocessor Systems Laboratory	1
Open Electives			1-10

(Depending on whether A&P certification track is chosen or another minor course of study)

Total Credits			**48-57**

Flight Area of Concentration

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
AS	232	Intermediate Aeronautics	3
AS	272	Advanced Aeronautics	2
FA	132	Commercial Pilot Flight I	1
FA	133	Commercial Pilot Flight II	1
FA	232	Commercial Pilot Flight III	1
FA	272	Commercial Pilot Flight IV	1
WX	201	Meteorology I	3
AS	309	Aerodynamics	3
AS	310	Aircraft Performance	3
AS	357	Flight Physiology	3
AS	387	Crew Resource Management	3
AS	402	Airline Operations	3
AS	408	Flight Safety	3

AND any two of the following:

Course		Title	Credits
AS	358	Advanced Avionics	3
AS	350	Domestic and International Navigation	3
AS	420	Flight Technique Analysis	3
AS	435	Electronic Flight Management Systems	3
Open Electives at 300-400 level			6
Total Credits			**48**

Information Technology Area of Concentration

Course		Title	Credits
BA	221	Advanced Computer Based Systems	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
COM	411	Publishing on the Internet	3
CS	118	Fundamentals of Computer Programming	3
CS	223	Scientific Programming in C	3
HF	310	Human-Computer Interaction	3
IT	210	Web Page Authoring and Design	3
IT	220	Introduction to Networking	3
IT	310	Web Site Management	3
IT	320	Network Configurations	3
IT	330	Programming for the Web	3
IT	340	WAN Theory and Design	3
		Upper-Division Elective	3
		Open Electives at 300-400 level	6
Total Credits			**48**

Academic Programs at the Daytona Beach Campus

Aeronautics

Bachelor of Science

The Aeronautics degree is designed specifically for students who work, have worked, or desire to work in aviation-related careers. For students with existing aviation-related knowledge and skills, this degree acknowledges a student's valuable acquired experience through the award of advance standing prior-learning credit. The curriculum then builds on those skills and knowledge. The program also provides an opportunity for those students new to aviation to acquire aviation-specific knowledge through aviation-related coursework. This combination of a student's aviation learning, aviation courses, business, computer science, economics, humanities, communications, social sciences, mathematics, and physical sciences, along with professional development elective courses and a minor course of study will prepare graduates for a career in an aviation-related field.

Aviation Area of Concentration

The Aviation Area of Concentration is the degree component that lets students select courses from various aviation-related fields. In addition, the AOC portion of the degree is where credit for prior aviation learning is applied. Thirty-six hours of credit are needed to satisfy the requirements of this portion of the Aeronautics degree. All or part of the credit needed for this degree requirement may be awarded based on prior aviation training or experience. To complete the AOC, in addition to any prior learning credit, students may select from courses in Aeronautical Science, Flight, Air Traffic Management, Safety (aviation-related), Aerospace Electronics, Applied Meteorology (aviation-related), Aviation Maintenance Science, Space Studies, or Homeland Security.

Evidence of Prior Aviation Learning

Applicants who qualify for admission to and matriculate in the degree program may be eligible for credit for prior learning. Applicants must be able to prove competence in an aviation occupation with authentic documentary evidence. Training and experience in closely related occupations can be combined.

Just as official transcripts are required to transfer credit from one university to another, original or authenticated documentation of prior learning from professional training and experience must be presented to qualify for award of Aviation Area of Concentration credit. Documentary evidence must be from objective third-party sources and must clearly describe the applicant's professional training, duties, and achievements in detail. Advanced standing credit will be awarded in accordance with the applicable Embry-Riddle Aeronautical University Curriculum Manual.

Duplicate Credit

Many Embry-Riddle courses are designed to teach the same skills and knowledge that Aeronautics students have acquired through experience and training. Students who complete courses in the same aviation specialty for which they were granted Aviation Area of Concentration credit would be duplicating coverage of the same subject matter. Credit for completion of such courses will not be applied to degree requirements. Credit for prior learning granted in the Aeronautics degree program may not be transferable to any other Embry-Riddle degree program.

Minor

Students must select and complete one minor field of study. Total credits within the minor will vary depending on which minor is chosen. Students typically select a minor that will enhance their aviation career. Courses required for the minor field of study may be used to fill Area of Concentration, Professional Development, or Open Elective degree requirements. See Minor Courses of Study in this catalog.

Aeronautics Curriculum

The curriculum to be followed by each student will vary depending on any AOC prior learning or transfer credits granted.

Curriculum

Aviation Area of Concentration 36
Advance standing credit and/or nonduplicating credit from AEL, AMS, AS, AT, FA, SF, SP, or WX courses.
Communication Theory and Skills* 9
Humanities/Social Sciences* 12
Lower-Level Humanities Elective 3
Lower-Level Social Sciences Elective
(PSY 220 and/or Lower-Level SS) 6
Upper-Level HU or SS Elective 3
Computer Science Elective. 3
Mathematics** 6
College Algebra or Higher-Level Mathematics 3
MA 112 College Mathematics for Aviation II -OR-
MA 222 Business Statistics -OR-
Higher-Level Mathematics 3
Physical Sciences** 6
Physical and Life Sciences Elective
One course must include a laboratory
Program Support 12
AS 254 Aviation Legislation 3
AS 405 Aviation Law 3
BA 201 Principles of Management -OR-
BA 210 Financial Accounting 3
EC 200 An Economic Survey -OR-
EC 210 Microeconomics -OR-
EC 211 Macroeconomics 3
Professional Development Electives 21
Select from Upper-Division (300-400) courses in AEL, AMS, AS, AT, BA, CS, EC, HS, IT, LET, SF, SP, STG, WX
Open Electives 15

Total Degree Credits **120**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified in the Aeronautics vertical outline. Other courses may also be used with permission of the undergraduate program coordinator.

Communication Theory and Skills
COM 122, 219, 221, 222

Humanities
HU 140 to HU 146

Social Sciences
LOWER-LEVEL: 100-200 Level
UPPER-LEVEL: 300-400 Level
HF 300, PSY 350

Dependent on the amount of upper-level Aviation Area of Concentration credit applied, some of the open or Communication/Humanities/Social Sciences electives in the B.S. degree may have to be 300-400 level courses to satisfy the graduation requirement of 39 credits of upper-level courses.

Cooperative Education credits may be used as open electives; however, assignments may not be in the student's occupational specialty.

** Students need to ascertain Mathematics and Physical Science pre/corequisites that are required for other courses. For example, PS 103/4 and MA 112 are required for many upper-division AS and WX courses.

Academic Programs at the Daytona Beach Campus

Aerospace Electronics

Bachelor of Science

The Aerospace Electronics degree program is designed to provide the requisite knowledge required to excel in the field of aerospace electronics in support of aerospace vehicles and systems. The general education requirements include mathematics, science, communications, and other applicable subjects. This balanced approach to education enables the graduate to apply techniques of critical thinking and problem-solving to a logical result in challenging situations. The primary focus of the degree program is entry positions in Commercial Off-The-Shelf Systems (COTS) development, Test and Evaluation, and Integrated Logistics Support (ILS) with aerospace electronics manufacturers, aircraft manufacturers, and related space industries.

Admissions Requirements

Students entering this program should have a basic background in math, physics, and chemistry. College Algebra and Trigonometry are the entry-level math courses. Students wishing to strengthen their background in math and the basic sciences before enrolling in the prescribed courses should contact the department chairman or the program coordinator for guidance.

Several courses in each academic year have prerequisites and/or corequisites. Check the course description section at the back of this catalog before registering for classes to ensure requisite sequencing.

Degree Requirements

The Bachelor of Science in Aerospace Electronics requires successful completion of 120 credits as outlined in the following course list. A minimum cumulative grade point average of 2.00 is required of all aerospace electronic related courses.

Suggested Program of Study

FRESHMAN YEAR

Course		Title	Credits
COM	122	English Composition and Literature	3
DET	111	Engineering Drawing	2
EC	200	An Economic Survey	3
EL	107	Direct and Alternating Current Fundamentals and Circuit Analysis	4
EL	108	Direct and Alternating Current Laboratory	1
HU		Lower-Level Humanities*	3
MA	145	College Algebra and Trigonometry	5
MA	241	Calculus and Analytic Geometry	4
PS	101	Basic Chemistry	3
PS	150	Physics I for Engineers	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
CS	223	Scientific Programming in C	3
EL	203	Microelectronics Fundamentals and Circuit Analysis	4
EL	204	Microelectronics Laboratory	1
EL	212	Digital Circuit Systems Analysis	4
EL	213	Digital Circuits Laboratory	1
EL	307	Microprocessor Systems	3
EL	308	Microprocessor Systems Laboratory	1
MA	242	Calculus and Analytic Geometry	4
MA	245	Applied Differential Equations	3
PS	160	Physics II for Engineers	3
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
Total Credits			**31**

JUNIOR YEAR

Course	Title	Credits
AEL 315	Linear Systems and Signals Analysis	3
AEL 316	Elements of Engineering Design and Laboratory Procedures	3
AEL 321	Advanced Communications Systems Analysis	4
AEL 322	Advanced Communications, Microwave and Control Laboratory Systems Analysis	1
AEL 323	Applied Control System Analysis	2
AEL 324	Microwave and Radar System Analysis	2
COM 219	Speech	3
COM 221	Technical Report Writing	3
HF 300	Human Factors I: Principles and Fundamentals	3
HU/SS	Upper-Level Elective	3
MET 200	Machine Shop Laboratory	1
PSY 220	Introduction to Psychology	3
Total Credits		**31**

SENIOR YEAR

Course	Title	Credits
	Open Elective (Upper Level)	3
AEL 411	Communications and Navigation Systems	3
AEL 412	Surveillance and Control Systems	3
AEL 413	Satellite Communications and Navigation Systems	4
AEL 414	System Test Evaluation Laboratory	1
AEL 421	Aerospace Electronic System Integration and Design	3
AEL 422	Integrated Logistics Support	3
AEL 423	Test System Development Laboratory	1
AEL 424	Senior Project	3
MA 412	Probability and Statistics	3
Total Credits		**27**
Total Degree Credits		**120**

* HUMANITIES

HU: 140, 141, 142, 143, 144, 145, 146

Academic Programs at the Daytona Beach Campus

Air Traffic Management

Bachelor of Science

The Applied Aviation Sciences Department offers a Bachelor of Science degree in Air Traffic Management (ATM). This degree is designed for students whose goal is to become an air traffic controller or seek employment in a related industry. The academic courses are designed to provide exposure to procedures and operations consistent with those found in Federal Aviation Administration air traffic control facilities. The ATM curriculum provides the knowledge and foundation designated by the FAA for eventual student entry into the FAA Academy where they will be integrated with graduates of other Collegiate Training Initiative (CTI) schools for additional air traffic control training.

Degree Requirements

The Bachelor of Science degree inAir Traffic Management requires successful completion of a minimum of 120 credit hours, normally completed in eight semesters. This includes a minor in a course of study as approved by the Applied Aviation Sciences Department.

Suggested Program of Study

Students should be aware that several courses in each academic year might have prerequisites and/or corequisites. Please check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Computer Science Elective*	3
		Physical Science with Laboratory*	3
		Lower-Level Humanities*	3
AS	120	Principles of Aeronautical Science	
		- OR -	
AS	132	Basic Aeronautics I	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
WX	201	Meteorology I	3
		Open Elective	3
Total Credits			**30**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Physical Science*	3
		Lower-Level Humanities*	3
AS	254	Aviation Legislation	3
AT	300	Air Traffic Management I	3
AT	302	Air Traffic Management II	3
BA	201	Principles of Management	3
EC	200	An Economic Survey	3
PSY	220	Introduction to Psychology	3
SF	210	Introduction to Aerospace Safety	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
AS	405	Aviation Law	3
AT	305	Air Traffic Management III	3
AT	315	VFR Control Tower	3
AT	401	Air Traffic Management IV	3
BA	314	Human Resource Management	3
HF	300	Human Factors I: Principles and Fundamentals	3
HF	335	Human Factors in Air Traffic Control	3
HU/SS		Elective (300-400)	3
		Upper-Level Open Elective	6
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
AT	405	Air Traffic Management V	3

Required courses necessary to complete one minor course of study approved by the Applied Aviation Sciences Department. 15-21

Open Electives to meet the requirement of 40 hours of upper-level courses and 120 total hours to complete the degree. 9-15

TOTAL DEGREE CREDITS **120**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Computer Science, Humanities, Social Sciences, Mathematics, and Physical Science may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified in the Air Traffic Management vertical outline.

COMMUNICATION THEORY AND SKILLS
COM: 122, 219, 221, 222, 410

HUMANITIES
HU: 140, 141, 142, 143, 144, 145, 362

SOCIAL SCIENCES
UPPER-LEVEL
SS: 310, 325, 350, 351, 352

PHYSICAL SCIENCE
PS: 101, 102, 103, 104, 108, 208, 215, 219, 303
(1 laboratory)

MATHEMATICS
MA: 111, 112, 140, 142, 241; MA 145, 241

Students enrolled in the Army, Navy or Air Force ROTC program may substitute MY, NSC, or AF courses for open elective courses.

Applied Meteorology

Bachelor of Science

The Applied Aviation Sciences Department offers a Bachelor of Science degree in Applied Meteorology. This program offers those students with a passion for weather the opportunity to study, observe, and explore atmospheric phenomena ranging from global climate to tornadoes in our new state-of-the-art Weather Center and computer-equipped classrooms. Besides mastering the essentials of meteorology, students will acquire the communication skills necessary to translate information about complex atmospheric features into the practical language of operational decision makers. The program aims to produce graduates with the necessary knowledge, analytical skills, and operational expertise to add value to any decision impacted by the weather. Graduates will be competitive for jobs ranging from the aviation and aerospace industry to radio and television to business and government/military operations of the 21st century.

Degree Requirements

The Bachelor of Science degree in Applied Meteorology requires successful completion of a minimum of 120 credit hours and can be attained in eight semesters. Students pursuing the Applied Meteorology degree will select one of four areas of concentration (AOC) from among Flight Weather, Media Weather, Commercial Weather, or the calculus-based Research AOC, generally by the end of their fourth semester. All students must complete the general education courses, Applied Meteorology core courses, and the required courses for one AOC in order to graduate with a Bachelor of Science in Applied Meteorology. Students wishing to become eligible for employment with the U.S. government as a meteorologist must complete the Research AOC in order to meet U.S. Office of Personnel Management Qualification Standards. All students entering the Applied Meteorology program must take a math placement test or show suitable advanced placement. Because many courses have prerequisites or corequisites, students in the Research AOC should prepare to begin the required calculus sequence as soon as they are eligible.

Bachelor of Science Degree in Applied Meteorology

	Hours
General Education (37 Research AOC)	36
Applied Meteorology Core	48
Area of Concentration (27 Research AOC)	28
Open Electives	8
Total Degree Credits	**120**

Academic Programs at the Daytona Beach Campus

University General Education

Course	Title	Credits
	Communication Theory and Skills	9
	Computer Science Elective	3
	Lower-Level Humanities (HU)	3
	Lower-Level Social Sciences (SS)	6
	Upper-Level HU/SS Elective	3
Course	**Title**	**Credits**
	Math (see specific AOC)	6 or 7
	Physics (see specific AOC)	6
Total Credits		**36 or 37**

Applied Meteorology Core

Course	Title	Credits
UNIV 101	College Success	1
AS 120	Principles of Aviation Science	3
CE AAS	Co-op/Internship or Approved Electives	6
MA 222	Business Statistics	3
WX 201	Meteorology I*	3
WX 261	Applied Climatology	3
WX 270	Weather Information Systems	3
WX 352	Meteorology II*	3
WX 353	Advanced Meteorology I	3
WX 354	Advanced Meteorology II	3
WX 355	Weather Analysis	5
WX 363	Thunderstorms	3
WX 365	Satellite and Radar Weather Interpretation	3
WX 427	Forecasting Techniques	3
WX 457	Weather Operations Seminar	3
Total Credits		**48**

*Indicates courses in the Aircraft Dispatcher Certification Program.

Flight Weather Area of Concentration

Course	Title	Credits
AS 132	Basic Aeronautics I	3
AS 133	Basic Aeronautics II	3
AS 232	Intermediate Aeronautics*	3
AS 272	Advanced Aeronautics*	2
AS 309	Aerodynamics	3
AS 310	Aircraft Performance	3
AS 410	Air Dispatch Operations*	3
AT 300	Air Traffic Management I*	3
WX 364	Weather for Aircrews	3
	Applied Meteorology Elective	2
Total Credits		**28**

* Indicates courses in the Aircraft Dispatcher Certification Program.

Media Weather Area of Concentration

Course	Title	Credits
COM 260	Introduction to Media	3
COM 265	Introduction to News Writing	3
COM 360	Media Relations I	3
COM 225	Science and Technology Communications	3
COM 330	Environmental Communications	3
HU 330	Values and Ethics -OR-	
COM 320	Mass Communications Law & Ethics	3
WX 202	Current Weather Discussion	1
WX 205	Reading the Clouds	1
WX 429	Severe Weather Seminar	2
	Applied Meteorology Electives	6
Total Credits		**28**

Commercial Weather Area of Concentration

Course	Title	Credits
BA 221	Advanced Computer Based Systems	3
BA 311	Marketing	3
BA 325	Social Responsibility and Ethics Management	3
EC 210	Microeconomics	3
EC 420	Economics of Air Transportation	3
	Applied Meteorology Electives	7
	Business Electives	6
Total Credits		**28**

Research Area of Concentration

Course	Title	Credits
CS 225	Computer Science II	3
MA 242	Calculus and Analytic Geometry II	4
MA 243	Calculus and Analytic Geometry III	4
MA 245	Applied Differential Equations	3
PS 216	Physics I Laboratory	1

Academic Programs at the Daytona Beach Campus

WX	320	Atmospheric Thermodynamics	3
WX	390	Atmospheric Physics	3
WX	490	Dynamic Meteorology I	3
WX	491	Dynamic Meteorology II	3
Total Credits			**27**

Suggested Program of Study

A word about math and physics requirements: meteorology is an application of math and physics to the sea of air in which we live. Students who wish to pursue graduate studies in the atmospheric sciences or who want to work for the federal government or who are on U.S. Air Force ROTC scholarship should enroll in the Research AOC and complete the math sequence MA 140, MA 241, MA 242, MA 243, and MA 245 by their junior year. Those students should also enroll in the physics sequence PS 215, PS 216, and PS 208. Students pursuing other AOCs should complete MA 111 and MA 112, and PS 103 and PS 104 with labs. Students who are undecided about their futures should begin with MA 140 and PS 215.

Flight Weather Area of Concentration

Students interested in providing weather services to the aviation/aerospace industry should follow this course of study during their last two years. The mix of courses will enhance the student's ability to communicate with people who build, fly, and control airplanes and flight activities. Courses designated with (*) are required for the Aircraft Dispatcher Certification Program.

FRESHMAN YEAR

Course		Title	Credits
UNIV	101	College Success	1
AS	120	Principles of Aeronautical Science	3
COM	122	English Composition and Literature	3
COM	219	Speech	3
HU	14X	Lower-Level Humanities	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I	3
PS	103L	Technical Physics I Laboratory	0
SS		Lower-Level Social Sciences Elective	3
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
COM	221	Technical Report Writing	3
EGR	115	Introduction to Computing for Engineers	3
SS		Social Sciences Elective	3
PS	104	Technical Physics II	3
PS	104L	Technical Physics II Laboratory	0
WX	202	Current Weather Discussion	1
WX	261	Applied Climatology	3
WX	270	Weather Information Systems	3
WX	353	Advanced Meteorology I	3
WX	354	Advanced Meteorology II	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
AS	232	Intermediate Aeronautics*	3
AS	272	Advanced Aeronautics*	2
AS	309	Basic Aerodynamics	3
AT	300	Air Traffic Management	3
MA	222	Business Statistics	3
WX	355	Weather Analysis	5
WX	383	Thunderstorms	3
WX	365	Satellite and Radar Weather Interpretation	3
Open Electives			3
Total Credits			**28**

SENIOR YEAR

Course		Title	Credits
AS	310	Aircraft Performance*	3
AS	410	Air Dispatch Operations*	3
CE AAS		Co-op/Internship	6
HU/SS		Upper-Level Humanities or Social Sciences Elective	3
WX	364	Weather for Aircrews	3
WX	427	Forecasting Techniques	3
WX	457	Weather Operations Seminar	3
		Open Electives	6
Total Credits			**30**

Commercial Weather Area of Concentration

To meet the growing demand for meteorologists by the private sector, students who select this option will be prepared to provide meteorological expertise to a wide range of weather-dependent industries. By selecting appropriate courses in this highly flexible AOC, students can also complete a Minor in Business Administration.

FRESHMAN YEAR

Course		Title	Credits
UNIV	101	College Success	1
AS	120	Principles of Aeronautical Science	3
COM	122	English Composition and Literature	3
COM	219	Speech	3
HU	14X	Lower-Level Humanities	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I	3
PS	103L	Technical Physics I Laboratory	0
SS		Lower-Level Social Sciences Elective	3
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
COM	221	Technical Report Writing	3
EC	210	Microeconomics (COM AOC) -OR-	
SS		Social Sciences Elective	3
EGR	115	Introduction to Computing for Engineers	3
MA	222	Business Statistics	3
PS	104	Technical Physics II	3
PS	104L	Technical Physics II Laboratory	0
WX	202	Current Weather Discussion	1
WX	261	Applied Climatology	3
WX	270	Weather Information Systems	3
WX	353	Advanced Meteorology	3
WX	354	Advanced Meteorology II	3
WX	365	Satellite and Radar Weather Interpretation	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
BA	221	Advanced Computer Based Systems	3
BA	311	Marketing	3
HU/SS		Upper-Level Humanities -OR-	
		Social Sciences Elective	3
WX	355	Weather Analysis	5
WX	363	Thunderstorms	3
		Applied Meteorology Electives	6
		Business Elective	3
		Open Electives	4
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
BA	325	Social Responsibility and Ethics in Management	3
CE	AAS	Co-op/Internship	6
EC	420	Economics of Air Transportation	3
WX	427	Forecasting Techniques	3
WX	457	Weather Operations Seminar	3
		Applied Meteorology Electives	5
		Business Elective	3
		Open Electives	4
Total Credits			**30**

Media Weather Area of Concentration

Students interested in journalism, radio, and television will combine meteorology with studies in verbal and written communications. Internships may be conducted with newspapers, radio stations, or network/cable television channels.

FRESHMAN YEAR

Course		Title	Credits
UNIV	101	College Success	1
AS	120	Principles of Aeronautical Science	3
COM	122	English Composition and Literature	3
COM	219	Speech	3
HU	14X	Lower Level Humanities	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I	3
PS	103L	Technical Physics I Laboratory	0
SS		Lower-Level Social Sciences Elective	3
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
COM	221	Technical Report Writing	3
EC	210	Microeconomics (COM AOC) -OR-	
SS		Social Sciences Elective	3

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Course		Title	Credits
EGR	115	Introduction to Computing for Engineers	3
MA	222	Business Statistics	3
PS	104	Technical Physics II	3
PS	104L	Technical Physics II Laboratory	0
WX	202	Current Weather Discussion	1
WX	261	Applied Climatology	3
WX	270	Weather Information Systems	3
WX	353	Advanced Meteorology	3
WX	354	Advanced Meteorology II	3
WX	365	Satellite and Radar Weather Interpretation	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
COM	260	Introduction to Media	3
COM	265	Introduction to News Writing	3
COM	360	Media Relations I	3
HU	330	Values and Ethics	3
SS		Social Science Elective	3
WX	205	Reading the Clouds	1
WX	355	Weather Analysis	5
WX	429	Severe Weather Seminar	2
		Applied Meteorology Electives	4
		Open Electives	5
Total Credits			**32**

SENIOR YEAR

Course		Title	Credits
CE AAS		Co-op/Internship	6
COM	225	Science and Technology Communications	3
COM	330	Environmental Communications	3
WX	427	Forecasting Techniques	3
WX	457	Weather Operations Seminar	3
		Applied Meteorology Electives	7
		Open Elective	3
Total Credits			**28**

Research Area of Concentration

Students wishing to go to graduate school in Meteorology, or wishing to become eligible for Meteorology employment with the U.S. government, or who are on ROTC Meteorology scholarships should choose the Research Area of Concentration. Students who choose the Research Area of Concentration should follow the four-year plan outlined below:

FRESHMAN YEAR

Course		Title	Credits
UNIV	101	College Success Seminar	1
AS	120	Principles of Aeronautical Science	3
COM	122	English Composition and Literature	3
MA	142	Trigonometry	3
MA	241	Calculus and Analytical Geometry	4
MA	242	Calculus and Analytical Geometry II	4
PS	215	Physics I	3
PS	216	Physics I Laboratory	1
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**28**

SOPHOMORE YEAR

Course		Title	Credits
COM	219	Speech	3
COM	221	Technical Report Writing	3
EGR	115	Introduction to Computing for Engineers	3
HU	14X	Lower-Level Humanities	3
SS		Social Sciences Elective	3
MA	243	Calculus and Analytical Geometry III	4
PS	208	Physics II	3
WX	353	Advanced Meteorology I	3
WX	354	Advanced Meteorology II	3
WX	365	Satellite and Radar Weather Interpretation	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
CE AAS		Co-op/Internship	6
CS	22	Computer Science II	3
MA	245	Applied Differential Equations	3
SS		Social Sciences Elective	3
WX	270	Weather Information Systems	3
WX	320	Atmospheric Thermodynamics	3
WX	355	Weather Analysis	5
WX	363	Thunderstorms	3
WX	390	Atmospheric Physics	3
Total Credits			**29**

SENIOR YEAR

Course		Title	Credits
HU/SS		Upper-Level Elective	3
MA	222	Business Statistics	3
SS		Lower-Level Elective	3
WX	261	Applied Climatology	3
WX	427	Forecasting Techniques	3
WX	457	Weather Operations Seminar	3
WX	490	Dynamic Meteorology I	3
WX	491	Dynamic Meteorology II	3
		Open Electives	8
Total Credits			**32**
Total Degree Credits			**120**

Homeland Security

Bachelor of Science

The Applied Aviation Sciences Department offers a Bachelor of Science degree in Homeland Security that is based on the needs of the United States and its citizens. It combines the University's General Education requirements with a solid core of security courses. This degree allows the student to take maximum advantage of transfer credits and University course offerings to create areas of specialization in which the student has an interest and in which there is a demonstrated need by industry.

The Homeland Security degree is designed for students who have an interest in obtaining a strong foundation in security and safety-related subjects. The goal of the degree is to produce graduates with entry-level skills who can provide security expertise in a variety of transportation and industrial settings, with an emphasis on those entities involved with aviation and aerospace. This program will produce security professionals who are skilled at securing and protecting the critical infrastructure of our nation, states, cities, and municipalities, and protection of the lives and property of its citizens. Graduates of this program will be able to secure industry infrastructure, and provide effective planning and response to, and emergency management of, events resulting from acts of terrorism or natural and man-made disasters.

Degree Requirements

The Bachelor of Science degree in Homeland Security requires successful completion of a minimum of 120 credit hours and is normally completed in eight semesters.

Students are required to complete 39 hours of General Education courses, 21 credit hours of core security courses, 9 hours of specified electives, 37 credit hours of supporting courses, and 14 hours of general/open electives.

Students transferring into the program who have earned academic credits in criminal justice, or who hold law enforcement certification or emergency medical technician (EMT) certification can be granted up to 23 credit hours from the specified elective and general/open elective areas.

Students enrolled in the Air Force, Army, or Navy ROTC program may substitute AF, MY, or NSC courses for open elective courses.

	Hours
General Education	36
Homeland Security Core	21
Specified Electives	9
Supporting Courses	40
General/Open Electives	14
Total Degree Credits	**120**

Academic Programs at the Daytona Beach Campus

General Education

Course		Title	Credits
HU		English II (141, 142, 142, 144, 145)	3
COM		Communication Skills (122, 219, 221, 222, 410, HU 362, 420)	9
MA		Math Sequence (MA 111 & 112 or 140 & 142	6
PS		Physics Sequence (One laboratory required)	6
CS		Computer Science Elective	3
EC	200	An Economic Survey	3
HU/SS		Upper-Level Elective (HU 330:Values and Ethics recommended)	3
PSY	220	Introduction to Psychology	3
Total Credits			**36**

Homeland Security Core Courses

Course		Title	Credits
HS	201	Introduction to Homeland Security	3
HS	301	Fundamentals of Transportation Security	3
HS	302	Fundamentals of Occupational Security	3
HS	306	Legal and Investigative Issues of Security	3
HS	307	Law Enforcement in Security	3
HS	401	Emergency Planning, Response, and Security Management	3
HS 402		Security and Risk Analysis	3
Total Credits			**21**

Supporting Courses

Course		Title	Credits
UNIV	101	College Success	1
AS	120	Principles of Aeronautical Science	3
BA	201	Principles of Management	3
HF	300	Human Factors I: Principles and Fundamentals	3
SS	331	Current Issues in America	3
HU	345	Comparative Religions -OR-	
SS	325	International Studies	3
MA	222	Business Statistics	3
PS	101	Chemistry	3
PS	101L	Chemistry Lab	0
PS	107	Elements of Biological Science	3
PSY	325	Group Structure and Process	3
SF	201	Introduction to Health, Occupational, and Transportation Safety	3
SF	355	Industrial Hygiene & Toxicology	3
SS	310	Personality Development	3
SS	340	American Foreign Policy	3
Total Credits			**40**

Specified Electives

BA	408	Airport Management	3
BA	410	Management of Air Cargo	3
BA	415	Airline Management	3
BA	425	Trends and Current Problems in Air Transportation	3
SF	210	Introduction to Aerospace Safety	3
SF	315	Environmental Compliance and Safety	3
SF	345	Safety Program Management	3
SF	350	Aircraft Crash and Emergency Management	3
SF	410	Design of Engineering Hazard Controls	3
STG	312	Global Crime and Criminal Justice Systems	3
STG	315	Studies in Global Intelligence	3
STG	400	Security and Globalization	3
STG	415	Studies in Global Intelligence II	3
SIS	XXX	Choice of any Global Security and Intelligence Studies Course	3
Total Credits			**9**

Other courses appropriate to the specified elective listing may be authorized by the Program Coordinator of the Homeland Security degree program.

Open Electives **14**

Total Credit Hours **120**

Suggested Program of Study

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills	3
		Lower-Level Humanities	3
AAS	101	Student Success	1
AS	120	Principles of Aeronautical Science	3
CS		Elective	3
EC	200	An Economic Survey	3
MA	111	College Mathematics for Aviation I -OR-	
MA	140	College Algebra	3
MA	112	College Mathematics for Aviation II -OR-	
MA	142	Trigonometry	3
PS	101	Chemistry	3
PS	103	Technical Physics I	3
Total Credits			**28**

SOPHOMORE YEAR

Course		Title	Credits
BA	201	Principles of Management	3
COM	219	Speech	3
COM	222	Technical Report Writing	3
HS	201	Introduction to Homeland Security	3
HS	301	Fundamentals of Transportation Security	3

Course		Title	Credits
MA	222	Business Statistics	3
PS	107	Elements of Biological Science	3
PS	104	Technical Physics II.	3
PSY	220	Introduction to Psychology	3
SF	201	Introduction to Health, Occupational, and Transportation Safety	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
HU/SS		Upper-Level Elective (HU 330: Values and Ethics recommended)	3
HU	345	Comparative Religions -OR-	
SS	325	International Studies	3
PSY	325	Group Structure and Process	3
HF	300	Human Factors I: Principles and Fundamentals	3
HS	302	Fundamentals of Occupational Security	3
HS	306	Legal and Investigative Issues of Security	3
HS	307	Law Enforcement in Security	3
SF	355	Industrial Hygiene and Toxicology	3
SS	340	American Foreign Policy	3
SS	310	Personality Development	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
SS	331	Current Issues in America	3
HS	401	Emergency Planning, Response, and Security Management	3
HS	402	Security and Risk Analysis	3
		Specified Electives	9
		General/Open Electives	14
Total Credits			**32**

TOTAL DEGREE CREDITS	**120**

Safety Science

Bachelor of Science

The Applied Aviation Sciences Department offers a Bachelor of Science degree in Safety Science that is based on the needs of the marketplace. It combines a solid core designed to meet the Aviation Accreditation Board International (AABI) standards and the University's General Education requirements. With a complete offering of Safety Science courses through two areas of concentration (AOCs), students can prepare to work in the aerospace industry as well as in nonaerospace industries.

The Safety Science degree is designed for students interested in obtaining a strong safety foundation. The goal of the degree is to produce graduates who are skilled in providing safety expertise in a variety of aviation, aerospace, and other industrial settings. This program will produce safety professionals who are skilled in providing safety management expertise and who can provide technical guidance in compliance issues involving FAA, EPA, OSHA, DOT, and state health, hygiene, and workplace standards.

Degree Requirements

The Bachelor of Science degree in Safety Science requires successful completion of a minimum of 120 credit hours and is normally completed in eight semesters.

Students are required to complete 39 hours of General Education courses as well as 43 hours of a Safety Science core curriculum. Transportation AOC related safety courses fill 24 hours of the degree program with the final 14 hours available as open electives. The Occupational Safety AOC fills 31 hours of the degree program with seven hours available for open electives. There are numerous minor fields of study for the student to choose from in order to meet specific desires.

Students enrolled in the Air Force, Army, or Naval ROTC program may substitute AF, MY, or NSC courses for open elective courses.

	Hours
General Education	39
Safety Science Core	43
Area of Concentration (Air Transportation/Occupational)	24/31
Open Electives (Air Transportation/Occupational)	14/7
Total Degree Credits	**120**

General Education

Course		Title	Credits
CS		Computer Science Elective	3
EC	200	An Economic Survey	3
HU		Humanities (HU 141, 142, 143, 144, 145)	3
COM		Communications Skills (COM 122, 219, 221)	9
HU/SS		Upper-Level Elective	3
MA		Math Sequence (MA 111, 112, 140, 142, 241, MA 145, 241)	6
PS		Physics Sequence (one laboratory required)	6
PSY	220	Introduction to Psychology	3
Total Credits			**36**

Safety Science Core

Course		Title	Credits
UNIV	101	College Success	1
AS	120	Principles of Aeronautical Science	3
AT	300	Air Traffic Management I	3
BA	201	Principles of Management	3
HF	300	Human Factors I Principles and Fundamentals	3

MA	222	Business Statistics	3
PS	101	Basic Chemistry	3
SF	201	Introduction to Health, Occupational, and Transportation Safety	3
SF	315	Environmental Compliance and Safety	3
SF	345	Safety Program Management	3
SF	355	Industrial Hygiene and Toxicology	3
SF	365	Fire Protection	3
SF	410	Design of Engineering Hazard Controls	3
SF	445	System Safety in Aviation	3
SF	462	Health, Safety, and Aviation Law	3
WX	201	Meteorology I	3
Total Credits			**46**

Transportation Safety (AIR) Area of Concentration

Suggested Program of Study

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Please check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

Course		Title	Credits
AS	309	Aerodynamics	3
AS	310	Aircraft Performance -OR-	
SF	350	Air Crash and Emergency Mgmt.	3
AS	356	Aircraft Systems and Components	3
SF	320	Human Factors in Aviation	3
SF	330	Aircraft Accident Investigation	3
SF	335	Mechanical and Structural Factors in Aviation	3
SF	375	Propulsion Plant Investigation	3
SF	435	Aircraft Crash Survival Analysis and Design	3
		Electives	14
Total Credits			**38**
Total Degree Credits			**120**

FRESHMAN YEAR

Course		Title	Credit
COM	122	Communication Theory and Skills	3
HU	14X	Lower-Level Humanities	3
AAS	101	Applied Aviation Science College Success Seminar	1
AS	120	Principle of Aeronautical Science	3
CS		Computer Science Elective	3
MA	111	College Math for Aviation I	3
MA	112	College Math for Aviation II	3
PS	101	Basic Chemistry	3
PS	103	Technical Physics I	3
PSY	220	Introduction to Psychology	3
SF	201	Introduction to Health, Occupational, and Transportation Safety	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
AT	300	Air Traffic Management I	3
BA	201	Principles of Management	3
COM	219	Speech	3
EC	200	An Economic Survey	3
HF	300	Human Factors I: Principles and Fundamentals	3
COM	221	Technical Report Writing	3
MA	222	Business Statistics	3
PS	104	Technical Physics II	3
WX	201	Meteorology I	3
SF	315	Environmental Compliance and Safety	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
AS	309	Aerodynamics	3
AS	356	Aircraft Systems and Components	3
SF	345	Safety Program Management	3
SF	355	Industry Hygiene and Toxicology	3
SF	365	Fire Protection	3
SF	320	Human Factors in Aviation	3
SF	330	Aircraft Accident Investigation	3
		Electives	9
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
AS	310	Aircraft Performance -OR-	
SF	350	Aircraft Crash and Emergency Management	3
HU/SS		Upper-Level Elective**	3
SF	335	Mechanical and Structural Factors in Aviation	3
SF	375	Propulsion Plant Investigation	3
SF	410	Design of Engineering Hazard Controls	3
SF	435	Aircraft Crash Survival Analysis and Design	3
SF	445	System Safety in Aviation	3
SF	462	Health, Safety, and Aviation Law	3
		Electives	5
Total Credits			**29**

**The recommended elective is - HU 330 Values and Ethics.

Academic Programs at the Daytona Beach Campus

Occupational Safety Area of Concentration

Suggested Program of Study

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Please check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

Course		Title	Credits
BA	314	Human Resource Management	3
BA	420	Management of Production and Operations	3
PS	105	General Chemistry I	4
PS	107	Elements of Biological Sciences	3
SF	311	Industrial Security	3
SF	316	Workers' Comp, Insurance & Risk Mgmt.	3
SF	380	Internship (or SF 350)	3
SF	405	Applications in Industrial Hygiene	3
SF	440	Design of Engineering Hazard Controls II	3
SF	450	Internship (or SF 330)	3
Open Electives			7
Total Credits			**38**

Total Degree Credits **120**

FRESHMAN YEAR

Course		Title	Credits
COM	122	Communication Theory and Skills*	3
HU	14X	Lower-level Humanities*	3
AAS	101	Applied Aviation Science College Success Seminar	1
AS	120	Principles of Aeronautical Science	3
IT	109	Introduction to Computers and Applications	3
MA	111	College Math for Aviation I	3
MA	112	College Math for Aviation II	3
PS	101	Basic Chemistry	3
PS	103	Technical Physics I	3
PSY	220	Introduction to Psychology	3
WX	201	Meteorology I	3
Total Credits			**31**

SOPHOMORE YEAR

Course		Title	Credits
AT	300	Air Traffic Management I	3
BA	201	Principles of Management	3
COM	219	Speech	3
EC	200	An Economic Survey	3
HF	300	Human Factors I: Principles and Fundamentals	3
COM	221	Technical Report Writing	3
MA	222	Business Statistics	3
PS	104	Technical Physics II	3
SF	201	Introduction to Health , Occupational, and Transportation Safety	3
SF	315	Environmental Compliance and Safety	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
AS	309	Aerodynamics	3
AS	356	Aircraft Systems and Components	3
SF	320	Human Factors in Aviation	3
SF	330	Aircraft Accident Investigation	3
SF	345	Safety Program Management	3
SF	355	Industry Hygiene and Toxicology	3
SF	365	Fire Protection	3
		Electives	9
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
AS	310	Aircraft Performance -OR-	
SF	350	Aircraft Crash and Emergency Management	3
HU/SS		Upper-level elective**	3
SF	335	Mechanical and Structural Factors in Aviation	3
SF	375	Propulsion Plan Investigation	3
SF	410	Design of Engineering Hazard Controls	3
SF	435	Aircraft Crash Survival Analysis and Design	3
SF	445	System Safety in Aviation	3
SF	462	Health, Safety, and Aviation Law	3
		Electives	5
Total Credits			**29**

** The recommended elective is HU 330 Values and Ethics.

Academic Programs at the Daytona Beach Campus

College of Business

Dr. Daniel Petree, Dean

Our aim is to provide a world-class business and management education in an aviation/aerospace context. That means we have assembled a community of faculty scholars with global reputations and reach. That means we have designed curricula at the graduate and undergraduate levels that set the standard in aviation/aerospace management education. That means our faculty and students have the opportunity to focus on cutting-edge solutions to real-world problems and opportunities found in aviation, aerospace, and transportation-related industries and organizations. Our dedication to excellence is manifested by our accreditation by ACBPS (the Association of Collegiate Business Programs and Schools) for all our degree programs and by AABI (Aviation Accreditation Board International) for our undergraduate degree program in Aviation Business Administration.

The College consists of two departments: the Department of Management, Marketing, Strategy, and Operations and the Department of Economics, Finance, Accounting, and Risk Management. Both departments are responsible for designing and delivering our undergraduate and graduate degrees. Our undergraduate degrees include the Bachelor of Science in Aviation Business Administration. This is our largest undergraduate degree program and combines a rigorous business/management core with depth of focus through the areas of concentration (similar to highly concentrated majors) in Airline Management, Airport Management, Aviation Marketing Management, Flight Operations, General Management, and International Air Transportation Management. This degree program offers graduates the specialized knowledge desired in the aviation industry along with the management and business general knowledge valuable to employers in any industry.

The Bachelor of Science in Aviation Management is designed to enhance the knowledge and expertise of those who have already earned the equivalent of an associate degree by providing the opportunity to add depth and breadth through upper-level business and management courses. It is a good way to lever an associate degree into a bachelor degree with the rigor and strength desired by employers in the aviation industry.

We offer the only Master in Business Administration in Aviation (MBA/A) in the United States. This degree is intended to give individuals who already hold undergraduate degrees, often in technical areas like engineering, the tools necessary to become a credible professional manager in aviation, aerospace, or related industries. The program of study combines common general management courses with areas of concentration in Airline Management, Airport Management, Aviation Human Resources, Aviation Systems Management, and Aviation Policy and Planning.

Academic Programs at the Daytona Beach Campus

Aviation Business Administration

Bachelor of Science

The Bachelor of Science degree in Aviation Business Administration requires successful completion of a minimum of 120 credit hours and is normally completed in eight semesters. Designed for students interested in obtaining a strong business foundation with emphasis on specific aviation applications, the degree lets the student select an area of concentration in Airline Management, Airport Management, Aviation Marketing Management, Flight Operations, General Management, or International Air Transportation Management. Students should declare their area of concentration at the beginning of their junior year. Students who want to specialize in more than one Area of Concentration may transfer up to 6 credit hours toward the second area of concentration. Students who participate in the Cooperative Education program may substitute up to 6 credit hours, if approved, toward the specified courses required in their area of concentration.

This program is accredited by the Aviation Accreditaation Board International (AABI).

Students enrolled in the Air Force, Army, or Naval ROTC program may substitute AF, MY, or NSC courses for the open elective courses.

Students should be aware that several courses in each academic year may require prerequisite subject knowledge and/or class standing. Check the course descriptions at the back of this catalog before registering for classes to ensure appropriate placement.

	Hours
General Education	33
Program Support	15
Business Core	45
Area of Concentration	15
Open Electives	12
Total Degree Credits	**120**

General Education*

Communication Theory and Skills	9
COM 122, 219, 222, -OR- 221	
Mathematics	6
MA 111, MA 220, -OR- MA 112	
Computer Science	3
IT 109 -OR- BA 120	
Physical and Life Sciences	6
(One course must include a laboratory.) PS 101-109, PS 142, PS 302, PS 308, PS 309 At the Daytona Beach campus, one course must be either chemistry or physics.	
Humanities Lower-Level Course	3
HU 140 Series	
Social Sciences Lower-Level Course	3
PSY 220, SS 110-130, 204, 210	
Humanities/Social Sciences Upper-Level Course	3
HU 300-400 Level, HF 300, PSY 350, SS 302-360	
Total Credits	**33**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Mathematics, Computer Science, Physical and Life Sciences, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met with the permission of the advisor. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Aviation Business Administration vertical outline. Other courses may also be used with the permission of a department chair.

Academic Programs at the Daytona Beach Campus

Program Support

Course		Title	Credits
AS	120	Principles of Aeronautical Science	3
EC	210	Microeconomics	3
EC	211	Macroeconomics	3
MA	211	Statistics with Aviation Application -OR-	
MA	222	Business Statistics	3
MA	320	Decision Math	3
Total Credits			**15**

Business Core

Course		Title	Credits
BA	201	Principles of Management	3
BA	210	Financial Accounting	3
BA	221	Advanced Computer Based Systems	3
BA	311	Marketing	3
BA	312	Managerial Accounting	3
BA	314	Human Resource Management	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	325	Social Responsibility and Ethics in Management	3
BA	332	Corporate Finance I	3
BA	335	International Business	3
BA	390	Business Law	3
BA	420	Management of Production and Operations	3
BA	436	Strategic Management	3
EC	315	Managerial Economics	3
Total Credits			**45**

Areas Of Concentration

International Air Transportation Management

The focus area is International Aviation. The culminating experience course is BA 426.

Course		Title	Credits
BA	426	International Aviation Managementt	3
BA	430	International Trade and Regulations*	3
BA/EC		Business Electives (300-400 level)	6
EC	420	Economics of Air Transportation	3
Total Credits			**15**

Airport Management

Course		Title	Credits
BA	408	Airport Management	3
BA	412	Airport Planning and Design Standards	3
BA	418	Airport Administration and Finance*	3
BA/EC		Business Electives (300-400 level)	6
Total Credits			**15**

Airline Management

Course		Title	Credits
BA	410	Management of Air Cargo	3
BA	415	Airline Management*	3
BA/EC		Business Electives (300-400 level)	6
EC	420	Economics of Air Transportation	3
Total Credits			**15**

Aviation Marketing Management

Course		Title	Credits
BA	405	General Aviation Marketing	3
BA	449	Strategic Marketing Management	3
BA	450	Airline/Airport Marketing*	3
BA/EC		Business Electives (300-400 level)	6
Total Credits			**15**

Flight Operations

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
AS	232	Intermediate Aeronautics	3
AS	272	Advanced Aeronautics	2
FA	132	Commercial Pilot Flight I	1
FA	133	Commercial Pilot Flight II	1
FA	232	Commercial Pilot Flight III	1
FA	272	Commercial Pilot Flight IV	1
Total Credits			**15**

Note: Students selecting this option need to begin the coursework as soon as possible. Please see the Advance Standing section under University Academic Regulations and Procedures and the Aeronautical Science notes under the Aeronautical Science degree in this catalog for information relating to these courses.

Academic Programs at the Daytona Beach Campus

General Management

Select any five BA/EC 300-400 level courses 15

Open Electives 12

Total Degree Requirements **120**

* This class is the capstone class for this area of concentration.

Courses Available as BA 300-400 Business Electives:

BA	308	Public Administration
BA	322	Aviation Insurance
BA	324	Aviation Labor Relations
BA	331	Transportation Principles
BA	405	General Aviation Marketing
BA	408	Airport Management
BA	410	Management of Air Cargo
BA	412	Airport Planning and Design Standards
BA	415	Airline Management
BA	418	Airport Administration and Finance
BA	419	Aviation Maintenance Management
BA	421	Small Business Management
BA	424	Project Management in Aviation Operations
BA	426	International Aviation Management
BA	427	Management of the Multi-Cultural Workforce
BA	430	International Trade and Regulations
BA	449	Strategic Marketing Management
BA	450	Airline/Airport Marketing
EC	420	Economics of Air Transportation

Suggested Program of Study

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills	3
		Lower-Level Humanities	3
		Lower-Level Social Sciences	3
		Computer Science	3
		Mathematics	6
		Physical and Life Sciences	3
BA	201	Principles of Management	3
BA	221	Advanced Computer Based Systems	3
EC	211	Macroeconomics	3
Total Credits			**30**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills	6
		Physical and Life Sciences	3
AS	120	Principles of Aeronautical Science	3
BA	210	Financial Accounting	3
BA	311	Marketing	3
EC	210	Microeconomics	3
MA	222	Business Statistics	3
MA	320	Decision Mathematics	3
		Open Elective	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
		Upper-Level Humanities -OR- Social Sciences*	3
BA	312	Managerial Accounting	3
BA	314	Human Resource Management	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	332	Corporate Finance I	3
BA	335	International Business	3
EC	315	Managerial Economics	3
		Concentration Courses	3
		Open Elective	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
BA	325	Social Responsibility and Ethics in Management	3
BA	390	Business Law	3
BA	420	Management of Production and Operations	3
BA	436	Strategic Management	3
		Concentration Courses	12
		Open Electives	6
Total Credits			**30**

Total Degree Credits **120**

* See general education on page 108

Aviation Management

Bachelor of Science

Degree Requirements

The Bachelor of Science degree in Aviation Management requires successful completion of a minimum of 120 credit hours and is normally completed in four semesters, depending on total credits transferred into the University. This degree is designed to accommodate the transfer student who has either completed an appropriate associate degree at an accredited regional college or university (generally 60 semester credit hours) or a minimum of 60 credit hours, which must be composed of courses from the following broad areas: Communication Skills, Mathematics, Physical Sciences, Computers, Business, Economics, Management, Humanities, and/or Social Sciences. In the business core courses, prerequisites not previously met may be taken from open elective credit hours. The curriculum for the degree provides a sound business foundation in all disciplines of business, enhanced by aviation business applications. Courses include accounting and finance, law, ethics, human resources, production, and strategic management.

Associate Degree Credit ††
-OR-
Minimum of 60 Credit Hours in Coursework 60
Business Core. 36
Aviation Management Core 15
Open Electives 9

Total Degree Requirements **120**

†† Assumes University general education requirements have been met and no further credit hours are required in this area.

Associate Degree Credit. 60

-OR -

Minimum of 60 credit hours in coursework which must be composed of courses from the following broad areas: Communication Skills, Mathematics, Physical Sciences, Computers, Business, Economics, Management, Humanities, and/or Social Sciences.

Business Core

BA	311	Marketing	3
BA	312	Managerial Accounting	3
BA	314	Human Resource Management	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	325	Social Responsibility and Ethics in Management	3
BA	332	Corporate Finance I	3
BA	335	International Business	3
BA	390	Business Law	3
BA	420	Management of Production and Operations	3
BA	436	Strategic Management	3
EC	315	Managerial Economics	3
Total Credits			**36**

Aviation Management Core 15
Five BA 300-400 business elective courses
Open Electives 9

Total Degree Requirements **120**

Academic Programs at the Daytona Beach Campus

Courses Available as BA 300-400 Business Electives:

BA 308 Public Administration
BA 322 Aviation Insurance
BA 324 Aviation Labor Relations
BA 331 Transportation Principles
BA 405 General Aviation Marketing
BA 408 Airport Management
BA 410 Management of Air Cargo
BA 412 Airport Planning and Design Standards
BA 415 Airline Management
BA 418 Airport Administration and Finance
BA 419 Aviation Maintenance Management
BA 421 Small Business Management
BA 424 Project Management in Aviation Operations
BA 426 International Aviation Management
BA 427 Management of the Multi-Cultural Work force
BA 430 International Trade and Regulations
BA 449 Strategic Marketing Management
BA 450 Airline/Airport Marketing
EC 420 Economics of Air Transportation

Suggested Program of Study

Associate Degree or Transfer Credits. 60

JUNIOR YEAR

Course		Title	Credits
BA	312	Managerial Accounting	3
BA	314	Human Resource Management	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	390	Business Law	3
EC	315	Managerial Economics	3
		Business Electives	6
		Open Electives	6
Total Credits			**30**

SENIOR YEAR

Course		**Title**	**Credits**
BA	311	Marketing	3
BA	325	Social Responsibility and Ethics in Management	3
BA	332	Corporate Finance I	3
BA	335	International Business	3
BA	420	Management of Production and Operations	3
		Business Electives	9
BA	436	Strategic Management	3
		Open Electives	3
Total Credits			**30**

Total Degree Requirements **120**

Academic Programs at the Daytona Beach Campus

College of Engineering

Dr. Reda Mankbadi, Dean

The College of Engineering at Embry-Riddle offers Bachelor of Science degrees in Aerospace Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Mechanical Engineering, and Software Engineering. Each of the degrees in the College of Engineering gives students the opportunity to acquire a depth of understanding in the degree while allowing unique aerospace strengths in each curriculum.

Embry-Riddle's Engineering program is the largest in the country and has been ranked by *U.S. News and World Report* as the # 1 program among non-Ph.D. granting institutions. The College of Engineering ranks among the top 10 best undergraduate programs among non-Ph.D. granting schools. In addition, the College of Engineering offers master degrees in Aerospace Engineering and in Software Engineering.

The College of Engineering emphasizes high-quality education and research activities that bring to the students the latest developments in the field. Students are continually encouraged and supported by faculty to strive for ingenious and creative solutions to today's technological problems through research projects on their own as well as joint projects with faculty.

Students acquire valuable hands-on experience using cutting-edge technology in the Design, Composites, Wind Tunnel, and Real Time lab among others. The College also holds many seminars and workshops for engineering students with both academic and industry speakers. This interaction with industry enables students to stay abreast of current industry conditions and advancements. College of Engineering graduates are regarded as some of the most knowledgeable and best-trained professionals entering their chosen fields.

FRESHMAN ENGINEERING

The Freshman Engineering Program is designed to prepare students for entry into the degrees offered by the College of Engineering. The first-year curriculum allows engineering students to take coursework that is common to every engineering degree in the College, allowing students flexibility in choosing engineering degrees without affecting the progress toward graduation.

The Freshman Engineering Program is designed to introduce students to the interdisciplinary aspects of engineering. Engineering courses, mathematics, computing, and physics courses are integrated to prepare students to work in teams for solving aerospace-related problems that reach across the broad areas of engineering.

Students entering the Freshman Engineering Program should have demonstrated a competence in mathematics and science. They should be prepared to enter Calculus I, having demonstrated proficiency in algebra and trigonometry. If necessary, students can prepare for entry into the Freshman Engineering Program by taking College Algebra (MA 140) and Trigonometry (MA 142) before taking Calculus and Analytic Geometry I (MA 241).

FRESHMEN YEAR

Course		Title	Credits
COM	122	English Composition and Literature I	3
COM	219*	Speech	3
EGR	101	Introduction to Engineering	2
EGR	115	Intro to Computing for Engineers	3
HU	14X	Humanities	3
MA	241	Calculus I	4
MA	242	Calculus II	4
PS	150	Physics I	3
PS	160	Physics II	3
SS		Lower-Level Social Sciences Elective	3
UNIV		101 College Success	1
Total Credits			**32**

* COM 219 is required in every degree for graduation. However, students are advised to postpone COM 219 during the first year in favor of one of the following courses based on the field of interest of the student:

Aerospace Engineering, Civil Engineering, or Mechanical Engineering: EGR 120, Graphical Communications, 3 credits.

Computer Engineering or Software Engineering: CS 225, Computer Science II, 4 credits.

Electrical Engineering: CEC 220/2, Digital Circuit Design with lab, 4 credits.

General Education Electives For Engineers

Embry-Riddle courses in the general education categories of Humanities and Social Sciences may be chosen from those listed below, assuming prerequisite and other listed requirements are met. Courses from other institutions are acceptable if they fall into these categories and are at the level specified in the particular engineering program.

Humanities: Any HU course at the required level.
Social Sciences: Any SS, EC, or PSY course at the required level. HF 300 is also acceptable.
Exceptions: Language courses must not be the student's native language. EC 200 is not acceptable together with EC 210 or EC 211 or their equivalent. Registering in a Special Topics course must be approved by the appropriate engineering department **before** taking the course.

Aerospace Engineering

Bachelor of Science

The Aerospace Engineering program exists in partial fulfillment of the University's purpose "to provide a comprehensive education to prepare graduates for productive careers and responsible citizenship with special emphasis on the needs of aviation, aerospace engineering, and related fields." The program's focus is primarily on the engineering of mission-oriented vehicles for atmospheric and space flight. The goal of the Aerospace Engineering program is to produce graduates who are ready for constructive roles in society, who qualify for entry-level engineering jobs in the aerospace industry or aviation-related fields, who qualify for admission to graduate programs in Aerospace Engineering (or related engineering fields), and who are prepared to continue learning throughout their lives.

In order to achieve these objectives, the following are the expected outcomes:

1. *Engineering responsibilities and methodology.* From their first semester onward, students will be made aware of what engineering is and what will be expected of them as engineers, including a commitment to continuing education and to engineering ethics. This will be accomplished through interdisciplinary team activities and design projects, workshops, and seminars, and the consistent assignment of open-ended problems throughout the curriculum.
2. *Professional activity and development.* Students will be encouraged throughout their Embry-Riddle careers to actively participate in professional organizations, to stay abreast of industry activity, and to continue their professional development.
3. *Technical communication.* Throughout the curriculum, wherever appropriate, student teams will make professional quality oral and written presentations.
4. *General education.* Students will satisfy the University's general education requirements to broaden the student's education, develop effective communication skills, and obtain awareness of social and ethical issues.
5. *Basic science and mathematics.* Students will demonstrate a knowledge of chemistry fundamentals (including oxidation/reduction, the essentials of physical chemistry, and the basics of organic compounds as related to composite materials), basic physics (mechanics, heat, sound, electricity, and optics), and mathematics (differential and integral calculus, differential equations, matrix algebra, and vector calculus) to use as tools in support of their studies of engineering topics and beyond.
6. *Engineering mechanics.* Students will demonstrate a knowledge of the fundamentals of classical engineering mechanics (as applied to rigid, elastic, and fluid media) to provide a foundation for the professional component of the curriculum as well as to become familiar with basic engineering problem-solving techniques, including team approaches.
7. *Aerodynamics and aeronautics.* Students will demonstrate a knowledge of topics in aerodynamics, to include a majority of the following: the aerospace environ-

ment; applications of mass, momentum, energy, and entropy principles to one- and two-dimensional flows; potential flow; viscous flow and boundary layers; aerodynamics of airfoils in incompressible and compressible flows; steady state aircraft performance; static stability; propeller and rotary wing fundamentals; applications of the concept of panel methods; supersonic flow; and aerodynamic heating.

8. *Thermal sciences.* Students will demonstrate knowledge of a sequence of topics in thermodynamics, heat transfer, and propulsion so as to be able to assess the operational capabilities and analyze the performance of air-breathing and rocket engines.
9. *Structures.* Students will demonstrate a knowledge of topics in aerospace structures and materials, to include as a minimum the equilibrium of forces and moments in three dimensions; shear and bending moment diagrams; stresses and deflections due to elastic tension, compression, shear, and torsion on stable cross sections; compression and shear buckling; composite materials; basics of the finite element method; and vibration, fatigue, and fracture mechanics concepts.
10. *Electronics.* Students will demonstrate a knowledge of topics in electric circuits, analog and digital electronic fundamentals, electromechanical devices, and instrumentation fundamentals.
11. *Astronautics.* Students will demonstrate a knowledge of topics in orbital mechanics, gyroscopic motion, and control systems with aerospace applications.
12. *Laboratories and data interpretation.* Students will demonstrate an ability to perform laboratory work, including statistical processing of data and error analysis, in materials, structures, aerodynamics, power and energy systems, electronics, and instrumentation.
13. *Design.* Students will carry out and defend the conceptual design of an aircraft or a spacecraft in an industry-like environment, in teams, using realistic constraints and considerations of cost, safety, manufacturability and maintainability, and the needs of the public. Students will likewise also carry out the detail design of an aircraft or a spacecraft system.
14. *Support hardware and software.* The program will be supported throughout by the use of modern equipment and the most relevant modern tools and techniques of engineering analysis, design, and production, including student experience with industry-level solid modeling (CAD/CAM), finite element, and computational fluid mechanics software.

To enter this program, students should have demonstrated competence in mathematics, physics, and chemistry in high school.

Degree Requirements

The Bachelor of Science in Aerospace Engineering program requires successful completion of a minimum of 129 credit hours. The program may be completed in eight semesters assuming appropriate background and full-time enrollment.

First-Year Requirement:

A student must attain a minimum cumulative grade point average of 2.25 in those courses prescribed by the College of Engineering Freshman Program (see page 121) before continuing the pursuit of an Aerospace Engineering degree.

Remaining on Track for AE:

Aerospace Engineering students must complete MA 241, MA 242, PS 150, PS 160, and EGR 115 with a C or better within three attempts (including audits and withdrawals) before attending any ES courses. Students should be aware that many courses have prerequisites and/or co-requisites. Check the course descriptions at the back of this catalog before registering for classes to ensure required sequencing.

FRESHMAN YEAR

See the common Freshman Year outline on page 120.

Total Credits 32

SOPHOMORE YEAR

Course		Title	Credits
COM	221	Technical Report Writing	3
COM	219	Speech -OR-	
EGR	120	Graphical Communications	3
ES	201	Statics	3
ES	202	Solid Mechanics	3
ES	204	Dynamics	3
ES	206	Fluid Mechanics	3
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	105	General Chemistry I	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
Total Credits			**34**

JUNIOR YEAR (AERONAUTICS OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	304	Aircraft Structures I	3
AE	313	Space Mechanics	3
AE	314	Experimental Aerodynamics I	1
AE	315	Experimental Aerodynamics Laboratory	1
AE	404	Aircraft Structures II	3
AE	413	Airplane Stability and Control	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	335	Electrical Engineering	2
EE	336	Electrical Engineering Laboratory	1
MA	441	Advanced Engineering Mathematics I	3
Total Credits			**32**

JUNIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	304	Aircraft Structures I	3
AE	313	Space Mechanics	3
AE	314	Experimental Aerodynamics I	1
AE	315	Experimental Aerodynamics Laboratory	1
AE	404	Aircraft Structures II	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	462	Electrical Engineering I with Laboratory	3
MA	441	Advanced Engineering Math I	3
		Technical Elective	3
Total Credits			**32**

JUNIOR YEAR (AEROSPACE PROPULSION OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	304	Aircraft Structures I	3
AE	313	Space Mechanics	3
AE	314	Experimental Aerodynamics I	1
AE	315	Experimental Aerodynamics Laboratory	1
AE	404	Aircraft Structures II	3
AE	413	Airplane Stability and Control	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	462	Electrical Engineering I with Laboratory	3
MA	441	Advanced Engineering Math I	3
Total Credits			**32**

SENIOR YEAR (AERONAUTICS OPTION)

Course		Title	Credits
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	420	Aircraft Preliminary Design	4
AE	421	Aircraft Detail Design	4
AE	430	Control Systems Analysis and Design	3
ES	405	Electrical Engineering II	3
HU/SS		Lower-Level Elective*	3
HU/SS		Upper-Level Elective*	3
		Technical Electives	6
Total Credits			**31**

Academic Programs at the Daytona Beach Campus

SENIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	426	Spacecraft Attitude Dynamics and Control	3
AE	427	Spacecraft Preliminary Design	4
AE	430	Control Systems Analysis and Design	3
AE	445	Spacecraft Detail Design	4
ES	405	Electrical Engineering II	3
HU/SS		Lower-Level Elective*	3
HU/SS		Upper-Level Elective*	3
		Technical Elective	3
Total Credits			**31**

SENIOR YEAR (AEROSPACE PROPULSION OPTION)

Course		Title	Credits
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	430	Control Systems Analysis and Design	3
AE	435	Air-Breathing Propulsion Preliminary Design	4
AE	440	Air-Breathing Propulsion Component Design	4
ES	405	Electrical Engineering	3
HU/SS		Lower-Level Elective*	3
HU/SS		Upper-Level Elective*	3
		Technical Elective	6
Total Credits			**31**
TOTAL DEGREE CREDITS			**129**

TECHNICAL ELECTIVES:

AE:	350, 395, 399, 401, 407, 409, 411, 415, 425, 433, 495, 499, 5XXU
CEAE:	With prior approval of the Aerospace Engineering Department
CEC:	320/322, 460
CS:	335, 344, 350, 317, 420
EGR:	305
EP:	320, 394
ES:	306, 315, 395, 399, 403, 412, 495, 499
MA:	412, 432, 438, 442, 443, 5XXU
PS:	301, 303, 320, 401
SE:	300

* Students may substitute upper-level AF, NSC, and MY courses or aeronautical certificates for the 6 credits of technical electives.

Accelerated Program in Aerospace Engineering

Bachelor of Science

Master of Aerospace Engineering

The accelerated program allows students with strong academic backgrounds to complete both B.S. and M.A.E. degrees in Aerospace Engineering. The goal of the program is to produce graduates who are prepared for careers in the aerospace industry and in research and development. The program augments the students' undergraduate background with graduate-level study and with course offerings in the areas of aerodynamics, structures, propulsion, and astronautics.

Degree Requirements

Students enrolled in the Bachelor of Science program in Aerospace Engineering may apply for entry into the accelerated program when they have completed about 90 hours of coursework. Students should have a CGPA of 3.20 (out of a possible 4.00) in AE/ES courses, at a minimum, for selection. For continued enrollment, a CGPA of 3.00 must be maintained. Each student is required to conduct an independent study in a topic of current interest in aerospace engineering under the guidance of an advisor, with a formal report due at the end. Three to six graduate credits, depending on the rigor and extent of the work, are earned through this work.

FRESHMAN YEAR

Course		Title	Credits
COM	122	English Composition and Literature I	3
COM	219	*Speech	3
EGR	101	Introduction to Engineering	2
EGR	115	Intro to Computing for Engineers	3
HU	14X	Humanities	3
MA	241	Calculus I	4
MA	242	Calculus II	4
PS	150	Physics I	3
PS	160	Physics II	3
SS		Lower-Level Social Sciences Elective	3
UNIV	101	College Success	1
Total Credits			**32**

SOPHOMORE YEAR

Course		Title	Credits
COM	221	Technical Report Writing	3
COM	219	Speech - OR-	
EGR	120	Graphical Communications	3
ES	201	Statics	3
ES	202	Solid Mechanics	3
ES	204	Dynamics	3
ES	206	Fluid Mechanics	3
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	105	General Chemistry I	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
Total Credits			**34**

JUNIOR YEAR (AERONAUTICS AND PROPULSION OPTIONS)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	304	Aircraft Structures I	3
AE	313	Space Mechanics	3
AE	314	Experimental Dynamics I	1
AE	315	Experimental Dynamics I Laboratory	1
AE	404	Aircraft Structures II	3
AE	413	Airplane Stability and Control	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
MA	441	Advanced Engineering Mathematics I	3
Total Credits			**32**

Academic Programs at the Daytona Beach Campus

JUNIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	304	Aircraft Structures I	3
AE	314	Experimental Dynamics I	1
AE	315	Experimental Dynamics I Laboratory	1
AE	313	Space Mechanics	3
AE	404	Aircraft Structures II	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
MA	441	Advanced Engineering Math I	3
		Technical Elective	3
Total Credits			**32**

SENIOR YEAR (AERONAUTICS OPTION)

Course		Title	Credits
HU/SS		Lower-Level Elective‡	3
HU/SS		Upper-Level Elective‡	3
		Technical Electives †	6
AE	408	Turbine and Rocket Engines	3
AE	420	Aircraft Preliminary Design	4
AE	421	Aircraft Detail Design	4
AE	430	Control Systems Analysis and Design	3
ES	405	Electrical Engineering II	3
AE	416	Aerospace Structures and Instrumentation Lab	1
AE	417	Aerospace Structures and Instrumentation Lab	1
Total Credits			**31**

SENIOR YEAR (PROPULSION OPTION)

Course		Title	Credits
HU/SS		Lower-Level Elective‡	3
HU/SS		Upper-Level Elective‡	3
		Technical Electives†	6
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	430	Control Systems Analysis and Design	3
AE	435	Air-Breathing Propulsion Preliminary Design	4
AE	440	Air-Breathing Propulsion Component Design	4
ES	405	Electrical Engineering II	3
Total Credits			**31**

SENIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	426	Spacecraft Attitude Dynamics and Control	3
AE	427	Spacecraft Preliminary Design	4
AE	430	Control Systems Analysis and Design	3
AE	445	Spacecraft Detail Design	4
ES	405	Electrical Engineering II	3
HU/SS		Lower-Level Elective*	3
HU/SS		Upper-Level Elective*	3
		Technical Elective	3
Total Credits			**31**
TOTAL UNDERGRADUATE CREDITS			**129**

GRADUATE-LEVEL STUDY

Course	Title	Credits
	Engineering Analysis	3
AE 696/699	Special Topics	3/6
	Electives ‡ (at least 9 hours at 600-level)	15/12
Total Credits		**21**
TOTAL DEGREE CREDITS		**150**

†Technical Electives: Students may satisfy this requirement by selecting from the 500-level graduate courses listed in this section.

‡Electives: The following may be selected as electives at the graduate level. The elective list has been grouped into areas of concentration.

Areas of Concentration:

Structures

This area includes Structural Analysis, Vibration, Nondestructive Testing, Composite Materials, Elasticity, Flight Dynamics, Controls, and Design Optimization.

Electives for Structures Concentration:

AE 502 Strength and Fatigue of Materials
AE 506 Airplane Dynamic Stability
AE 514 Introduction to the Finite Element Method
AE 518 Acoustic Emission Nondestructive Testing
AE 520 Perturbation Methods in Engineering
AE 522 Analysis of Aircraft Composite Materials
AE 612 Analysis of Aircraft Plate and Shell Structures

AE 616 Advanced Aircraft Structural Dynamics
AE 699 Special Topics in Aerospace Engineering

Aerodynamics and Propulsion

This area includes Aerodynamics, Propulsion, Computational Aero and Fluid Dynamics, Transition and Turbulence, Aeroacoustics, Heat Transfer, and Combustion.

Electives for Aerodynamics and Propulsion Concentration:

AE 504 Advanced Compressible Flow
AE 508 Heat Transfer
AE 512 Combustion I
AE 516 Computational Aeronautical Fluid Dynamics
AE 528 Advanced Incompressible Aerodynamics
AE 530 Aeroacoustics
AE 610 Advanced Computational Fluid Dynamics
AE 620 Boundary Layer Theory
AE 640 Turbine Engine Propulsion Systems
AE 648 Thermal Stresses in Aerospace Engineering
AE 650 Special Topics in Aerodynamics and Propulsion Engineering
AE 652 Turbulent Flows

Astronautics and Control

This area includes Space Vehicles, Space Power, and Systems Control.

Electives for Astronautics Concentration:

AE 508 Heat Transfer
AE 524 Rocket Engine Propulsion Systems
AE 526 Engineering Optimization
AE 606 Finite Element Aerospace Applications
AE 620 Boundary Layer Theory
AE 646 Nonlinear Dynamical Systems and Chaos

Civil Engineering

Bachelor of Science

The demand for civil engineers educated in the fields of airports, transportation, aviation and aerospace planning, and analysis and design is strong and is expected to grow rapidly in the future. Air and ground transportation systems have substantially expanded in the last few years and are expected to continue to grow at an increasing pace. Space utilization and exploration initiatives are certain to produce further demand for civil engineers with aerospace interests. The Civil Engineering program at Embry-Riddle is uniquely designed to produce graduates with the types of skills and experiences that employers in these lucrative fields find highly desirable.

Graduates of the Civil Engineering program will leave the University with an understanding of the classical areas of civil engineering with an emphasis on transportation, structural design, and materials science in aviation and aerospace fields developed through a carefully planned series of courses and laboratories. Small class size and personal attention allow the interjection of practical interdisciplinary design projects throughout the curriculum. Students will develop individual problem-solving skills while practicing the fundamental team-building skills needed for success as a professional engineer. Embry-Riddle Civil Engineering graduates gain the knowledge and self-confidence to handle any situation that may arise and will welcome challenges by carrying an appreciation for learning that will last throughout their professional careers. As graduates of a program fully accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: 410-347-7700), students will have the necessary background to further their formal education through graduate school if desired.

Admission Requirements

To enter this program, students should have demonstrated competence in mathematics, physics, and chemistry in high school. They should be prepared to enter Calculus I, having demonstrated proficiency in algebra and trigonometry. Students who wish to strengthen their background in mathematics and physical science should consult the program chair for guidance before enrolling in the prescribed courses.

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

Degree Requirements

The Bachelor of Science in Civil Engineering program requires successful completion of a minimum of 131 semester hours. The program may be completed in eight regular semesters, assuming appropriate background and full-time enrollment. A minimum cumulative grade point average of 2.00 is needed for all required CIV, AE, EE, EGR, and ES courses, including engineering electives.

FIRST AND SECOND SEMESTERS

See the common Freshman Year outline on page 120.
Total Credits 32

THIRD SEMESTER

Course	Title	Credits
CIV 311	Introduction to Transportation Engineering	3
COM 219	Speech -OR-	
EGR 120	Graphical Communications	3
ES 201	Statics	3
MA 243	Calculus and Analytic Geometry III	4
PS 250	Physics III for Engineers	3
PS 253	Physics Laboratory for Engineers	1
Total Credits		**17**

FOURTH SEMESTER

Course	Title	Credits
ES 202	Solid Mechanics	3
ES 204	Dynamics	3
MA 345	Differential Equations and Matrix Methods	4
PS 105	General Chemistry I	4
	Civil Engineering Transportation Elective	3
Total Credits		**17**

FIFTH SEMESTER

Course	Title	Credits
COM 221	Technical Report Writing	3
CIV 140	Engineering Measurements with Laboratory	2
CIV 304	Structural Analysis	3
CIV 307	Civil Engineering Materials I with Laboratory	4
CIV 316	Hydraulics	3
Total Credits		**15**

SIXTH SEMESTER

Course	Title	Credits
	Civil Engineering Materials Elective	3
	Civil Engineering Structures Elective	3
CIV 320	Soil Mechanics	4
CIV 370	Computational Methods in Civil Engineering	3
EE 306	Introduction to Electrical Systems	2
ES 305	Thermodynamics	3
Total Credits		**18**

SEVENTH SEMESTER

Course	Title	Credits
	Civil Engineering Geotechnical Elective	3
	Civil Engineering/Technical Elective	3
CIV 330	Computer Applications in Transportation	2
HU/SS	Upper-Level Elective	3
HU/SS	Lower-Level Elective	3
MA 412	Probability and Statistics	3
Total Credits		**17**

EIGHTH SEMESTER

Course	Title	Credits
CIV 460	Senior Design Project	3
HU/SS	Upper-Level Elective	3
	Engineering/Technical Electives	6
	Open Elective	3
Total Credits		**15**

Total Degree Credits **131**

Civil Engineering Electives

Course	Title	Credits
CIV 340	Construction Engineering	3
CIV 362	Engineering and Construction Operations in Space	3
CIV 421	Geotechnical and Foundation Engineering	3
CIV 422	Design of Pavement Structures	3
CIV 424	Rehabilitation of Pavement Structures	3
CIV 431	Reinforced Concrete Design	3
CIV 432	Structural Steel Design	3
CIV 441	Civil Engineering Materials II	3
CIV 447	Airport Design I	3
CIV 457	Airport Design II	3
CIV 490	The Civil Engineering Profession	1
CIV 499	Directed Design Project	1-3
CIV 199, 299, 399	Special Topics in Civil Engineering	1-3

Academic Programs at the Daytona Beach Campus

Computer Engineering

Bachelor of Science

The Bachelor of Science in Computer Engineering degree gives the student the opportunity to acquire a broad background in computer design, including embedded control systems, real-time systems, telecommunication systems, and software engineering. The curriculum includes courses in general education, computer science, software engineering, and electrical engineering, and features a capstone senior design. The program's emphasis on real-time embedded control systems and hardware/software interfaces provides program graduates employment opportunities beyond graduates of traditional computer engineering programs, including positions in the aerospace and defense industries.

The goal of the Computer Engineering program is to produce graduates who are successful practitioners of computer engineering. The detailed objectives of the program are that our graduates:

- Effectively analyze, design, and implement computer systems, including embedded, real-time, and safety-critical computer systems.
- Demonstrate professionalism in their work and grow professionally through continued learning and involvement in professional activities.
- Contribute to society by behaving ethically and responsibly.
- Communicate effectively in oral, written, and newly developing modes and media.
- Assume a variety of roles in teams of diverse membership.

The program curriculum is designed to facilitate accomplishment of these objectives by program graduates. The program includes significant project work designed to prepare students to work as part of a team on the development of complex systems involving both software and hardware. It allows the student opportunities to develop capabilities in teamwork, designing to requirements,' and quality assurance techniques. The Computer Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Telephone: (410) 347-7700).

Degree Requirements

The Bachelor of Science in Computer Engineering can be earned in eight semesters assuming appropriate background and full-time enrollment. Successful completion of a minimum of 127 credit hours is required. To enter this program, students should have demonstrated competence in mathematics, physics, and computer programming in high school, and they should be prepared to enter Calculus and Analytical Geometry I and Computer Science I. If necessary, students can prepare for the program by taking College Algebra (MA 140) and/or Trigonometry (MA 142) before taking Calculus and Analytic Geometry (MA 241). Students should check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

Academic Programs at the Daytona Beach Campus

FIRST YEAR

See Common Freshman Year outline on page 120.

Total Credits	**32**

SECOND YEAR

Course	Title	Credits
CEC 220	Digital Circuit Design	3
CEC 222	Digital Circuit Design Laboratory	1
CEC 320	Microprocessor Systems	3
CEC 322	Microprocessor Systems Laboratory	1
COM 221	Technical Report Writing	3
CS 222	Introduction to Discrete Structures	3
EE 223	Linear Circuit Analysis I	3
EE 224	Electrical Engineering Laboratory I	1
MA 243	Calculus and Analytic Geometry III	4
MA 345	Differential Equations and Matrix Methods	4
PS 250	Physics III for Engineers	3
PS 253	Physics Laboratory for Engineers	1
CS 225	Computer Science II* (3 credits lecture, 1 credit lab) –or–	4
COM 219	Speech*	3
Total Credits		**34/33**

* Students in the Computer Engineering program are encouraged to take CS 225 during the first year, postponing COM 219 until the second year.

THIRD YEAR

Course	Title	Credits
CEC 300	Computing in Aerospace and Aviation	3
CEC 330	Digital System Design with Aerospace Applications	4
CEC 310	Signals and Systems	3
CS 420	Operating Systems	3
EC 225	Engineering Economics	3
EE 302	Electronic Devices and Circuits	3
EE 304	Electronic Circuits Laboratory	1
HU/SS	Humanities/Social Sciences Elective	3
MA 412	Probability and Statistics	3
SE 300	Software Engineering Practices (3 credits lecture, 1 credit lab)	4
CEC 450	Real Time Systems	3
Total Credits		**33**

FOURTH YEAR

Course	Title	Credits
CEC 420	Computer Systems Design I (2 credits lecture, 1 credit lab)	3
CEC 421	Computer Systems Design II (1 credit lecture, 2 credit lab)	3
CEC 460	Telecommunication Systems	3
CEC 470	Computer Architecture	3
CEC/EE	3/4 Elective * (3 credit lecture, 1 credit lab)	4
	HU/SS 3/4XX Humanities or Social Sciences Elective (upper division)	3
	Specified Electives **	9
Total Credits		**28**
Total Degree Credits		**127**

*EE 401/402, CEC 410/411, EE 410/412, other CEC/EE (300/400) with the approval of the program coordinator.

**Specified electives are courses to be selected, with the approval of the program coordinator, to support acquiring a minor, an identified concentration of domain knowledge (e.g., aerospace, aviation, business, communications, human factors, mathematics, etc.) or further depth in computer engineering or related disciplines.

Academic Programs at the Daytona Beach Campus

Computer Engineering/Master of Software Engineering

Bachelor of Science

Master of Software Engineering

This is a five-year program that allows exceptional students to complete both a B.S. in Computer Engineering and a Master of Software Engineering degree. This program is available at the Daytona Beach campus only. The objective of this five-year program, in addition to the objective for the Computer Engineering program, is to produce professional software engineers with advanced knowledge and skill in:

- Fundamentals of computing (discrete mathematics, programming languages, operating systems, computer architecture, and so on)
- Software systems development for real-time embedded applications
- Use of personal and team software processes
- Understanding the breadth of software engineering's terminology, tools, and techniques
- Use of requirements engineering and software architecture and design
- Use of modern software development methodologies (for example, object-oriented analysis and design)
- Software development in "real" work environments

Degree Requirements

Students interested in pursuing this program must meet the following requirements:

- Maintain at least a 3.2 cumulative GPA throughout the academic program.
- Maintain at least a 3.0 cumulative GPA for the graduate credits.
- Complete a total of 151 credit hours (listed in a subsequent section). There will be 124 credit hours of undergraduate requirements (equivalent to the B.S. in Computer Engineering) and 27 credit hours of graduate requirements (equivalent to a Master of Software Engineering degree).
- The program includes a requirement for two summer internships in the industry. Credit at the undergraduate and graduate level will be awarded for approved and successful work.

YEAR 1

See common Freshman Year outline on page 120.

Total Credits **32/33**

YEAR 2

Course		Title	Credits
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Design Laboratory	1
CEC	320	Microprocessor Systems	3
CEC	322	Microprocessor Systems Laboratory	1
COM	221	Technical Report Writing	3
CS	222	Introduction to Discrete Structures	3
EE	223	Linear Circuit Analysis I	3
EE	224	Electrical Engineering Laboratory I	1
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
CS	225	Computer Science II* (3 credits lecture, 1 credit lab) -OR-	4
COM	219	Speech*	3
Total Credits			**34/33**

* Students in the Computer Engineering program are encouraged to take CS 225 during the first year, postponing COM 219 until the second year.

Academic Programs at the Daytona Beach Campus

YEAR 3

Course	Title	Credits
CEC 300	Computing in Aerospace and Aviation	3
CEC 310	Signals and Systems	3
CEC 330	Digital System Design with Aerospace Applications	4
CEC 450	Real Time Systems	3
CS 420	Operating Systems	3
EC 225	Engineering Economics	3
EE 302	Electronic Devices and Circuits	3
EE 304	Electronics Circuits Laboratory	1
HU/SS	Humanities/Social Sciences Elective	3
MA 412	Probability and Statistics	3
SE 300	Software Engineering Practices (3 credits lecture, 1 credit lab)	4
Total Credits		**32**

SUMMER TERM (BETWEEN YEAR 3 AND YEAR 4)

Course	Title	Credits
CESE 4XX	Cooperative Education	3
Total Credits		**3**

The student must spend the term performing a co-op in a software industry and be engaged in a software engineering activity (such as analysis, design, code, or test).

YEAR 4

Course	Title	Credits
CEC 420	Computer Systems Design I (2 credit lecture, 1 credit lab)	3
CEC 421	Computer Systems Design II (1 credit lecture, 2 credits lab)	3
CEC 460	Telecommunication Systems	3
CEC 470	Computer Architecture	3
CEC/EE 3/4	Elective * (3 credit lecture, 1 credit lab)	4
HU/SS3/4XX	Humanities or Social Sciences Elective (upper division)	3
SE 500	Software Engineering Concepts	3
SE 510	Software Project Management	3
SE 530	Software Requirements Engineering	3
Total Credits		**28**

FIVE-YEAR CE/MSE CURRICULUM

Summer Term (between YEAR 4 and YEAR 5)

Course	Title	Credits
CESE 5XX	Cooperative Education	3
Total Credits		**3**

The student must spend the term performing a co-op in a software industry and be engaged in a software engineering activity (for example, analysis, design, code, or test).

YEAR 5

Course	Title	Credits
SE 555	Object-Oriented Software Construction	3
SE 610	Software Architecture and Design	3
SE	Elective**	12
Total Credits		**18**
5 Year Total		**151**

* EE 401/402, CEC 410/411, EE 410/412, other CEC/EE (300/400) with the approval of the program coordinator.

** SE 520 Formal Methods for Software Engineering
SE 535 GUI Design and Evaluation
SE 545 Specification and Design of Real-Time Systems
SE 625 Quality Engineering and Assurance
SE 565 Concurrent and Distributed Systems
SE 575 Software Safety
SE 655 Performance Analysis of Real-Time Systems
SE 585 Metrics and Statistical Methods of Software Engineering
SE 660 Formal Methods for Concurrent and Real-Time Systems

While other elective courses may be selected, the student's advisor and the program coordinator must approve the selection.

Academic Programs at the Daytona Beach Campus

Computer Science

Bachelor of Science

The curriculum for the Bachelor of Science degree in Computer Science includes courses in software development, computer organization, database systems, real-time systems, and software engineering. The program provides a blend of theory and applications that prepares students for a variety of computer science and software engineering positions in scientific and business fields, and lays the foundation for graduate studies in computer science and software engineering. Upper-level courses involve students in team projects that emphasize industrial processes and practices. The elective courses in the program let students broaden their general education or pursue specific interests.

Degree Requirements

The Bachelor of Science degree can be earned in eight semesters assuming appropriate background and full-time enrollment. Successful completion of a minimum of 120 credit hours is required.

Students entering this program should have demonstrated a competence in mathematics and science (preferably physics). They should be prepared to enter Calculus I, having demonstrated proficiency in algebra and trigonometry. Students can prepare for this program by taking MA 140, College Algebra, and MA 142, Trigonometry, prior to taking MA 241. For those students who have not taken physics in high school, it is recommended that PS 103, Technical Physics I, be taken prior to PS 150. For those students who have not taken a course in computer programming in high school, it is strongly recommended that CS 118, Fundamentals of Computer Programming, be taken before CS 125.

The Computer Science program is designed to prepare students to work as part of a team on the development of software systems. Software engineering concepts are integrated through the curriculum. The curriculum includes courses in general education, math science, and computing. The latter is divided into computing fundamentals, advanced concepts, applied computing, and software engineering. In addition, a student can acquire a minor or a concentration in a domain area of interest.

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
CS	100	Introduction to Computing	1
CS	125	Computer Science I	4
CS	222	Introduction to Discrete Structures	3
CS	225	Computer Science II	4
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
PS	150	Physics I for Engineers	3
PS	160	Physics II for Engineers	3
Total Credits			**29**

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Lower-Level Humanities*	3
AS	120	Principles of Aeronautical Science	3
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Design Laboratory	1
CEC	320	Microprocessor Systems	3
CEC	322	Microprocessor Systems Laboratory	1
CS	315	Data Structures and Algorithms	3
MA	412	Probability and Statistics	3
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
SE	300	Software Engineering	4
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Lower-Level Social Sciences*	6
CEC	470	Computer Architecture	3
CS	317	Files and Database Systems	3
CS	332	Organization of Programming Languages	3
CS	420	Operating Systems	3
SE	310	Analysis and Design of Software Systems	3
		Math Elective**	3
		Specified Elective†	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
		Upper-Level Humanities -OR- Social Sciences*	6
CEC	450	Real-Time Systems	3
CS/SE/CEC Elective (300/400 level)			6
SE	450	Software Team Project	3
		Specified Elective	9
		Humanities/Social Sciences Elective	3
Total Credits			**30**

TOTAL DEGREE CREDITS **120**

** MA 243, MA 245, or a 300/400 level math course.

† Courses will be selected, with the approval of the student's advisor, to support acquiring a minor or an identified concentration of domain knowledge (for example, aviation, business, communications, human factors, math, etc.).

Electrical Engineering

Bachelor of Science

The Bachelor of Science degree in Electrical Engineering provides the student with the opportunity to acquire a broad background in circuit theory, communication systems, computers, control systems, electromagnetic fields, energy sources and systems, and electronic devices. Emphasis on design places the Embry-Riddle Electrical Engineering student in a unique position to increase employment opportunities after graduation.

Two tracks are available in the Electrical Engineering program: Telecommunications and Systems. The first two years are common, so students do not need to make a track decision until the beginning of their third year.

Degree Requirements

The Bachelor of Science in Electrical Engineering requires the successful completion of a minimum of 129 credit hours.

FRESHMAN YEAR

See the common Freshman Year outline on page 120.

Total Credits **32/33**

SOPHOMORE YEAR

Course		Title	Credits
CEC	220	Digital Circuit Design (or COM 219)	3
CEC	222	Digital Circuit Design Laboratory	1
CEC	320	Microprocessor	3
CEC	322	Microprocessor Laboratory	1
COM	221	Technical Report Writing	3
CS	225	Computer Science II	4
EE	223	Linear Circuit Analysis	3
EE	224	Electrical Engineering Laboratory	1
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
SYS	301	Introduction to Systems Engineering	3
Total Credits			**33/34**

Aerospace Systems Track

The modern aircraft is an assembly of a wide spectrum of components all operating together in a large and complex system. The aircraft then operates in the National Airspace System where it must operate in harmony with other aircraft, air traffic management, navigation, and safety systems all at a reasonable cost. This example shows the importance of systems engineering and the broad range of subjects covered.

JUNIOR YEAR

Course		Title	Credits
SYS	302	Syst. Engineering Design Considerations	3
EE	300	Linear Circuits II	3
EE	301	Linear Circuits Laboratory	1
EE	302	Electronic Devices	3
CEC	315	Signals and Systems	3
EE	304	Electronic Devices Lab	1
EE	310	Introduction to Electrical Comm.	3
SYS	303	Optimization in Systems Engineering	3
SYS	304	Syst. Engineering in Management, Risk, and Decision Making	3
HU/SS	1/2XX	HU/SS	3
HU/SS	2/3XX	HU/SS	3
MA	441	Advanced Engineering Mathematics	3
Total Credits			**32**

SENIOR YEAR

Course		Title	Credits
EC	225	Engineering Economics	3
EE	3/4XX	EE Upper Level	3
EE	401	Control Systems Analysis and Design	3
EE	402	Control Systems Laboratory	1
		Tech. Electives 3/400	3
HU/SS	3/400	HU/SS Upper Level	3
HU/SS	XXX	HU/SS Elective	3
SYS	405	Aerospace Systems Guidance and Control	3
SYS	417	Senior Systems Engineering Project	3
SYS	403	Systems Engineering Life Cycle Costing	3
SYS	410	Space Systems and Mission Analysis	3
Total Credits			**31**
TOTAL DEGREE CREDITS			**129**

TELECOMMUNICATIONS TRACK

The Telecommunications track of the Electrical Engineering program provides preparation for students interested in the all-important communications field. Aerospace applications abound, including extensive networks for air traffic management, airline operations, and space communications. Wired and wireless communications systems are covered.

JUNIOR YEAR

Course		Title	Credits
CEC/EE/MA/PS/SE	3/4XX	Upper-Level Elective	3
CEC	315	Signals and Systems	3
EE	300	Linear Circuits II	3
EE	301	Linear Circuits Lab	1
EE	302	Electronic Devices	3
EE	304	Electronic Devices Lab	1
EE	310	Introduction to Electrical Comm.	3
EE	340	Electrostatics and Magnetic Fields	3
ES	XXX	Engineering Sciences Elective	3
HU/SS	1/2XX	Humanities/Social Sciences Elective	3
HU/SS	2/3XX	Humanities/Social Sciences Elective	3
MA	441	Advanced Engineering Mathematics	3
Total Credits			**32**

SENIOR YEAR

Course		Title	Credits
CEC	410	Digital Signal Processing	3
CEC	411	Digital Signal Processing Lab	1
EC	225	Engineering Economics	3
EE	3/4XX	EE Elective (upper division)**	3
EE	401	Control Systems	3
EE	402	Control Systems Lab	1
EE	417	Digital Communications	3
EE	422	Wired and Fiber Optics Communications	3
EE	424	Wireless Communications	3
EE	425	Wireless Communications Lab	1
EE	475	Senior Telecommunications Project	3
HU/SS	3/4XXX	Humanities/Social Sciences Elective (upper division)	3
HU/SS	XXX	Humanities/Social Sciences Elective	3
Total Credits			**33**
TOTAL DEGREE CREDITS			**131**

** Advanced EE electives are selected from a list provided by the department chair.

Mechanical Engineering

Bachelor of Science

The Mechanical Engineering program is a component of the College of Engineering's goal to become a "comprehensive" college. This is of great benefit of the student as well. Mechanical Engineering is an old and established engineering discipline that still provides opportunities for state-of-the art systems, research, and design. Mechanical engineers have been in demand for literally hundreds of years and remain one of the more sought after degree holders.

The common freshman year is the first year of the Mechanical Engineering program. The second year is the same as Aerospace Engineering, which gives the student great flexibility when deciding his or her major field of study.

The Mechanical Engineering program has areas of emphasis in High Performance Vehicles and Robotics, which adds to the breadth of topics in mechanical engineering such as energy systems, heat transfer, thermal power systems, and vibration.

The robotics area prepares students for the rapidly expanding robotics field. Applications of robotics technology are found throughout the aerospace industry as well as most other fields. The robotics area covers the fundamentals of robotics with a wide variety of applications preparing the student for a wide range of occupations. Attention is paid to the systems nature of robotics to include the integration of mechanics and electronics.

The high-performance vehicle area offers subjects applicable to all types of vehicles, from competition vehicles to fuel-efficient and environmentally friendly vehicles. Subjects include aerodynamics, structures, and safety. The high-performance vehicle focus area prepares students for employment in vehicle design and manufacturing.

The objectives of the Mechanical Engineering degree are to produce graduates who:

- Have a solid background in the basic mechanical engineering subjects.
- Can plan, analyze, design, and schedule mechanical systems, including those in high-performance vehicles, energy and power, and robotics.
- Contribute to society and the mechanical engineering profession through professional societies as well as acting in an ethical manner.
- Can work in diverse team environments with knowledge of the breadth of engineering topics.
- Demonstrate knowledge of the mechanical design process.

The curriculum is designed to accomplish the objectives with a base of engineering, math, and sciences that includes probability, statistics, or numerical methods; engineering economics; advanced mathematics; electrical engineering; and engineering design. The culmination of the program is a two-semester design project that prepares the students in working in a team environment on projects involving mechanical engineering.

FRESHMAN YEAR

See the common Freshman Year outline on page 120.

Total Credits **32**

SOPHOMORE YEAR

Course		Title	Credits
COM	221	Technical Report Writing	3
COM	219	Speech -OR-	
EGR	120	Engineering Graphics	3
ES	201	Statics	3
ES	202	Solid Mechanics	3
ES	204	Dynamics.	3
ES	206	Fluid Mechanics	3
MA	243	Calculus III	4
MA	345	Differential Equations & Matrix Methods	4
PS	105	General Chemistry	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
Total Credits			**34**

JUNIOR YEAR

Course		Title	Credits
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
EE	401	Control Systems Analysis & Design	3
EE	402	Control Systems Lab	1
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
ES	305	Thermodynamics	3
HU/SS		Lower-Level Elective	3
MA	412	Probability and Statistics	3
ME	300	Machine Design and Lab	4
ME	302	Robotic I	3
ME	303	High Performance Vehicles I	3
ME	415	Modeling and Numerical Simulations of Energy and Environmental Systems	3
Total Credits			**32**

SENIOR YEAR

Course		Title	Credits
EC	225	Engineering Economics.	3
ES	403	Heat Transfer	3
HU/SS		Upper-Level Elective	3
ME	400	Vibration & Acoustics	3
ME	403	Thermal Power Systems	3
ME	406	Robotic II	3
ME	409	High Performance Vehicles II	3
ME	412	Senior Project	4
ME	4XX	ME Electives	3
		Technical Elective	3
Total Credits			**31**

TOTAL DEGREE CREDITS **129**

Academic Programs at the Daytona Beach Campus

Software Engineering

Bachelor of Science in Software Engineering

The Bachelor of Science degree in Software Engineering is designed to prepare students for an entry-level software engineering position in industry that supports the design and implementation of software systems with the focus on real-time, embedded, and safety-critical applications. Such systems are critical in aviation, space, medicine, and other disciplines that rely on high-quality, dependable software. The objectives of the Software Engineering program are that our graduates:

- Effectively analyze, design, and implement software systems, including embedded, real-time, and safety-critical systems.
- Demonstrate professionalism in their work and grow professionally through continued learning and involvement in professional activities.
- Contribute to society by behaving ethically and responsibly.
- Communicate effectively in oral, written, and newly developing modes and media.
- Successfully assume a variety of roles in teams of diverse membership.

The curriculum is designed to facilitate accomplishment of these objectives by program graduates. It provides a broad education, including fundamental knowledge about computer software and hardware. It also allows graduates to work in a team environment and to recognize the value of collaborative effort. The program lays a foundation for lifelong learning, professional growth, and ethical and responsible behavior in society.

Degree Requirements

The Bachelor of Science degree can be earned in eight semesters assuming appropriate background and full-time enrollment. Successful completion of a minimum of 127 credit hours is required.

Students entering this program should have demonstrated a competence in mathematics and science (preferably physics). They should be prepared to enter Calculus I, having demonstrated proficiency in algebra and trigonometry. Students can prepare for this program by taking MA 140, College Algebra, and MA 142, Trigonometry, prior to taking MA 241. For those students who have not taken physics in high school, it is recommended that PS 103, Technical Physics I, be taken prior to PS 150.

The Software Engineering program is designed to prepare students to work as part of a team on the development of software systems. Software engineering concepts, methods, and techniques are integrated through the curriculum. The curriculum includes courses in general education, math and science, and computing. The latter is divided into computing fundamentals, advanced concepts, applied computing, and software engineering. In addition, a student can acquire a minor or a concentration in a domain area of interest. Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

The Software Engineering program is accredited by the Engineering Accreditation Commission of Accreditation Board for Engineering Technology (111 Market Place, Suite 1050, Baltimore, MD 21202-4012,: Telephone: (410) 347-7700).

FIRST YEAR

See common Freshman Year outline on page 120.

Total Credits **32/33**

SECOND YEAR

Course		Title	Credits
AS	120	Principles of Aeronautical Science	3
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Design Laboratory	1
CEC	320	Microprocessor Systems	3
CEC	322	Microprocessor Systems Laboratory	1
COM	221	Technical Report Writing	3
CS	222	Introduction to Discrete Structures	3
CS	315	Data Structures and Algorithms	3
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
SE	300	Software Engineering Practices (3 credits lecture, 1 credit lab)	4
CS	225	Computer Science II* (3 credits lecture, 1 credit lab) -OR-	4
COM	219	Speech*	3
Total Credits			**32/31**

* Students in the Software Engineering program are encouraged to take CS 225 during the first year, postponing COM 219 until the second year.

THIRD YEAR

Course		Title	Credits
CEC	470	Computer Architecture	3
CS	317	Files and Database Systems	3
CS	332	Organization of Programming Languages	3
CS	420	Operating Systems	3
EC	225	Engineering Economics	3
HU/SS	XXX	Humanities/Social Sciences Elective	3
MA	3/4XX	Math Elective **	3
MA	412	Probability and Statistics	3
SE	310	Analysis and Design of Software Systems	3
SE	320	Software Construction	3
CEC	450	Real Time Systems	3
Total Credits			**33**

FOURTH YEAR

Course		Title	Credits
CEC/CS/SE	3/4XX	Elective	3
HU/SS	3/4XX	Humanities/Social Sciences Elective (upper division)	3
		Open Elective	3
SE	410	Formal Software Modeling	3
SE	420	Software Quality Assurance and Testing	3
	450	Software Team Project I (2 credits lecture, 1 credit lab)	3
SE	451	Software Team Project II (1 credit lecture, 2 credits lab)	3
		Specified Electives***	9
Total Credits			**30**

TOTAL DEGREE CREDITS **127**

** Math elective to be selected from an approved list of courses maintained by the program coordinator.

*** Courses to be selected, with the approval of the program coordinator, to support acquiring a minor, an identified concentration of domain knowledge (aerospace, aviation, business, communications, human factors, mathematics, etc.), or further depth in software engineering or related disciplines.

Software Engineering/Master of Software Engineering

Bachelor of Science

Master of Software Engineering

This is a five-year program that allows exceptional students to complete both the Bachelor of Science in Software Engineering (BSSE) and Master of Software Engineering (MSE) degrees. This program is available at the Daytona Beach campus only.

The objective of this five-year program is to produce professional software engineers with advanced knowledge and skill in:

- Fundamentals of computing (discrete mathematics, programming languages, operating systems, computer architecture, and so on)
- Software systems development for real-time embedded applications
- Use of personal and team software processes
- Understanding the breadth of software engineerings terminology, tools, and techniques
- Use of requirements engineering and software architecture and design
- Use of modern software development methodologies (such as object-oriented analysis and design)
- Software development in "real" work environments.

Students interested in pursuing this program must meet the following requirements:

- Maintain at least a 3.2 cumulative GPA throughout the academic program.
- Maintain at least a 3.0 cumulative GPA for the graduate credits.
- Complete a total of 151 credit hours (listed in a subsequent section). There will be 124 credit hours of undergraduate requirements (equivalent to the B.S. in Software Engineering) and 27 credit hours of graduate requirements (equivalent to a Master of Software Engineering degree).
- The program includes a requirement for two summer internships in the industry. Credit at the undergraduate and graduate level will be awarded for approved and successful work.

YEAR 1

See common Freshman Year outline on page 120.

Total Credits **32/33**

YEAR 2

Course		Title	Credits
AS	120	Principles of Aeronautical Science	3
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Design Laboratory	1
CEC	320	Microprocessor Systems	3
CEC	322	Microprocessor Systems Laboratory	1
COM	221	Technical Report Writing	3
CS	222	Introduction to Discrete Structures	3
CS	315	Data Structures and Algorithms	3
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
SE	300	Software Engineering Practices (3 credits lecture, 1 credit lab)	4
CS	225	Computer Science II* (3 credits lecture, 1 credit lab) -OR-	4
COM	219	Speech	3
Total Credits			**32/31**

* Students in the Software Engineering program are encouraged to take CS 225 during the first year, postponing COM 219 until the second year.

YEAR 3

Course	Title	Credits
CEC 450	Real Time Systems	3
CEC 470	Computer Architecture	3
CS 317	Files and Database Systems	3
CS 332	Organization of Programming Languages	3
CS 420	Operating Systems	3
EC 225	Engineering Economics	3
HU/SS XXX	Humanities/Social Sciences Elective	3
MA 3/4XX	Math Elective **	3
MA 412	Probability and Statistics	3
SE 310	Analysis and Design of Software Systems	3
SE 320	Software Construction	3
Total Credits		**33**

** Math elective to be selected from an approved list of courses maintained by the program coordinator.

SUMMER TERM (BETWEEN YEAR 3 AND YEAR 4)

Course	Title	Credits
CESE 4XX	Cooperative Education	3
Total Credits		**3**

The student must spend the term performing a co-op in a software industry and be engaged in a software engineering activity such as analysis, design, code, or test.

YEAR 4

Course	Title	Credits
CEC/CS/SE 3/4XX	Elective	6
HU/SS 3/4XX	Humanities/Social Sciences Elective (upper division)	3
SE 500	Software Engineering Concepts	3
SE 530	Software Requirements Engineering	3
SE 625	Quality Engineering and Assurance	3
	Open Elective	3
SE 410	Formal Software Modeling	3
SE 450	Software Team Project I (2 credits lecture, 1 credit lab)	3
SE 451	Software Team Project II (1 credit lecture, 2 credits lab)	3
Total Credits		**30**

Summer Term (between YEAR 4 and YEAR 5)

Course	Title	Credits
CESE 5XX	Cooperative Education	3
Total Credits		**3**

The student must spend the term performing a co-op in a software industry and be engaged in a software engineering activity such as analysis, design, code, or test.

YEAR 5

Course	Title	Credits
SE 510	Software Project Management	3
SE 610	Software Architecture and Design	3
SE	Elective**	3
SE	Elective**	3
SE	Elective**	3
SE	Elective**	3
Total Credits		**18**
5 Year Total		**151**

** SE 520 Formal Methods for Software Engineering
SE 535 GUI Design and Evaluation
SE 545 Specification and Design of Real-Time Systems
SE 565 Concurrent and Distributed Systems
SE 575 Software Safety
SE 655 Performance Analysis of Real-Time Systems
SE 585 Metrics and Statistical Methods of Software Engineering
SE 660 Formal Methods for Concurrent and Real-Time Systems

While other elective courses may be selected, the student's advisor and the program coordinator must approve the selection.

Academic Programs at the Prescott Campus

College of Arts and Sciences

Dr. Richard Bloom, Dean

Welcome. Our programs and curricula encompass the humanities, communication, the physical and life sciences, the social and psychological sciences, mathematics, economics, business, management, security and intelligence studies, and military science. In essence, our wide variety of offerings signifies that our College puts the universe in university. Through our academic experience we offer mental, physical, and spiritual enrichment so that our students can succeed in all areas of life from the professional to the personal. The College of Arts and Sciences, Prescott campus, is dedicated to providing state-of-the-art (1) general education, (2) degree programs centered on challenges facing today's era of globalization, (3) Reserve Officer Training commissioning (ROTC) programs under the auspices of the U.S. Army and U.S. Air Force, (4) Federal TRIO programs encompassing the Math Science Regional Center, Upward Bound, and the Ronald E. McNair Scholars Program, (5) international education and exchange programs, (6) professional consultation supporting the needs of government and industry, and (7) scholarly accomplishment creating knowledge for the benefit of humanity. Cherished pursuits of the College are developing leaders, inculcating moral and ethical integrity, resolving world issues, and maintaining the unquenchable passion of the human soul.

General Education. The College offers courses in math, the physical and life sciences, the social and psychological sciences, humanities, communication, economics, business, management, and security and intelligence studies. These courses provide essential knowledge supporting all University degree programs. They also provide an intellectual grounding necessary for 21st century success on the student's terms. Finally, they shape the priceless skills of speech, writing, quantitative analysis, and critical thinking. General education is founded on wisdom accumulated from the beginnings of intellectual history to the present and is culled from a rich selection of eras, epochs, cultures, and historical moments. It is the general education contribution that makes Embry-Riddle a truly outstanding university with a timeless heart and soul.

Degree Programs. The College offers five degree programs: Science, Technology, and Globalization; Global Security and Intelligence Studies; Aerospace Studies; Space Physics; and Aviation Business Administration.

U.S. Army Air and U.S. Air Force ROTC. ROTC activities are administratively situated in the College to ensure the highest quality educational experience for all ROTC cadets. Please refer to the Special Academic Programs and Opportunities section of the catalog for more information.

Federal TRIO Programs. The Math Science Regional Center and Upward Bound provide special services and programs for college-bound students from disadvantaged backgrounds as described

Academic Programs at the Prescott Campus

in the Higher Education Act of 1965, Title IV, Part A, Subpart 2. The prestigious Ronald E. McNair Scholars Program offers financial aid, academic, and other professional support to eligible underserved (low income/first generation) or under-represented (minorities and women in certain degree programs), upper-division students who desire to pursue graduate studies after graduation from Embry-Riddle. Please refer to the Financial Assistance section of the catalog for more information.

International Education. All students have the option of receiving a portion of their undergraduate education at selected universities in Europe, Asia, Latin America, Africa, and the Middle East. Other international education experiences include co-ops and internships. The College matches the needs of each student with prospective academic institutions.

Professional Consultation. Faculty work on grants, contracts, and consultancies with federal, state, and local governments. These faculty members also set world standards in partnership with corporations and other business and industrial entities. Finally, they shape public opinion through extensive mass media communication. Of special note are the College's Global Security and Intelligence Studies (GSIS) faculty, who continue to break new ground in aviation security, homeland security and defense, antiterrorist and counterterrorist policy, and international risk and threat assessment. A unique GSIS asset is the Global Intelligence Monitoring Center (GIMC), which is corporately funded, staffed by faculty and students, and dedicated to state-of-the-art training in intelligence analysis. The GIMC produces daily intelligence products that are transmitted to clients worldwide. Students have the opportunity to work closely with the faculty and have gone on to successful careers in government, the military, and business. This is also the case for students in the Aviation Business Administration program, who participate in faculty-led teams providing security management and environmental management consulting for airports and other transportation sites.

Scholarly Accomplishment. All faculty are engaged in creating knowledge for the benefit of humanity. Knowledge may be basic or applied and covers all the arts and sciences. Students often work closely with faculty on grants, contracts, and other scholarship pursuits. These opportunities most often occur at the national laboratories.

Conclusion. At the Prescott Campus, the College of Arts and Sciences works closely with the Colleges of Aviation and Engineering. The result is a seamless and unsurpassed educational experience that places the student on the road to professional, social, and personal success. The College of Arts and Sciences also is fully engaged with the rest of the world to further knowledge, resolve problems, and help chart the future.

Academic Programs at the Prescott Campus

Aerospace Studies

Bachelor of Science

Program Plan of Study and Requirements

The Aerospace Studies program consists of core requirements and three minors. The core requirements in this program help make our students worldly thinkers who understand that information and skills gleaned from one area of life can be applied to other areas. The program's core requirements respond directly to calls by American corporate leaders for graduates who understand both technology and human beings. To that end, students choose from courses in the humanities, geography, international studies, philosophy and ethics, and psychology. The core prepares students to connect their three minor fields of study meaningfully and usefully. In the capstone experience, the student chooses a senior thesis or a co-op in industry.

By combining three minors, students design their own degree programs. Such combinations as security/psychology/safety or space studies/computer science/psychology offer combinations of fields that the aerospace industry should find useful. A minor in Asian Studies, Security, or Technology, Policy, and Management will add an international component to the degree. Minors in the business areas give students practical knowledge that combines well with the more technical areas. The element of choice in the program gives students experience in planning their own futures. The program seeks to produce students with an entrepreneurial spirit who will cross boundaries, make creative connections, and become leaders in aviation and aerospace.

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

Degree Requirements

The Bachelor of Science degree in Aerospace Studies requires successful completion of a minimum of 120 credit hours. Included in the 120 credit hours must be 40 credit hours of upper-division courses (300-400 level).

General Education

Courses	**Credits**
Communication Theory and Skills*	9
Computer Science	3
Lower-Level Humanities*	3
Mathematics	6
Physical and Life Sciences (One course must include a laboratory)	6
Lower-Level Social Sciences*	6
HU/SS 300-400 level*	3
Total Credits	**36**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories.

Academic Programs at the Prescott Campus

Communication Theory and Skills

COM: 122, 219, 221, 222, 260, 351, 360, 364, 410, 411, 420
HU: 319, 355, 361, 362, 363, 399, 499

Humanities

LOWER-LEVEL:
HU 140-146
UPPER-LEVEL:
HU 300-400 level

Social Sciences

LOWER-LEVEL:
EC 200, 210, 211
(EC 200 is not acceptable together with EC 210 or EC 211 or their equivalent.)
PSY 220
SS 110, 120, 130, 204, 210
STG 205
UPPER-LEVEL:
HF 300
PSY 350
SS 302, 305, 310, 320, 325, 326, 331, 340, 350, 352, 360, 399, 499

Core Requirements

Course		Title	Credits
AS	120	Principles of Aeronautical Science -OR-	
SP	110	Introduction to Space Flight -OR-	
FAA		Private Pilot Certificate	3
BA	105	American Business Enterprise -OR-	
BA	201	Principles of Management	3
ES	100	Engineering and Society	3
HU		*One course from the Humanities Series (HU 140-HU 146) -OR-	
SS	204	Introduction to Geography	3
HU/SS		International Studies Electives (Selected from BA 335, HU 335, SS 325, SS 326, SS 331 or SS 340, STG 305, STG 310)	6
HU	330	Values and Ethics -OR-	
HU	341	World Philosophy (if not taken for general education credit)	3
MA	222	Business Statistics (if not taken for general education credit)	3
PSY	220	Introduction to Psychology (if not taken for general education credit)	3
CE	396/397	Cooperative Education -OR-	3-6
HU	480	Senior Thesis Research	1
HU	485	Senior Thesis Writing	2
Total Credits			**21-33**

*Must be chosen from one of the courses above not used to satisfy general education credit.

Minors

Students must select three minor fields of study. At least one of these must be aviation/aerospace related. Total credits in the minors will vary, depending on the minors chosen. See Minor Courses of Study in this catalog.

Open Electives 0-21

Total Degree Credits 120-132

Academic Programs at the Prescott Campus

Aviation Business and Management Program

Aviation Business Administration

The Aviation Business Administration degree program, offered by the Department of Business Administration, reflects the ever-changing and demanding environment of business, government, and the aviation industry. The curriculum is designed to provide graduates with the knowledge and skills essential to their successful entry into business and society. Emphasis is placed on effective communications quantitative skills, global awareness, social responsibility, information technology, critical thinking skills, teamwork, business functional skills, aviation/aerospace industry familiarity, and a commitment to lifelong learning.

This degree program offers a unique educational experience for the business-focused student. It is the appropriate foundation for entry into career opportunities in business, management, airport management, or flight operations management. Course requirements include computer applications, group/individual projects and presentations, and blend theory and applications to best prepare students for a variety of positions in the workplace. Colloquia, forums, visiting speakers, interesting field trip experiences, and interdisciplinary opportunities/activities serve to enrich the curriculum.

Diverse elective courses allow students to broaden their general education interests or pursue specific interests in many specialized areas, including the following: international commerce, economics/finance, aviation/aerospace, security and intelligence, the environment, aviation safety, and culture and language. A variety of unique "minors" (minor programs of study) are available for interested students wishing to supplement their formal academic preparation with specialized coursework in more than 20 additional areas of study.

Active business/aviation related clubs on campus include *Phi Beta Lambda* (a business focused organization providing students an opportunity to travel to state and national leadership conferences for participation in competitive events) and the *American Association of Airport Executives* (an aviation management focused association, with prior travel/conference attendance in China, New York City, Las Vegas, Houston, and San Francisco).

Our students are encouraged to think beyond traditional academic boundaries and seek workplace and cultural experiences that will enrich and enlighten them on the evolving workplace and the global business environment. Unique internships and cooperative educational experiences are available and encouraged, with staff assigned to assist students in position identification and placement. Numerous summer-abroad experiences are available for students wishing to increase their international perspectives. Previous summer-abroad academic programs have been offered in Paris, London, Italy, Poland, China, Germany, Ecuador, Chile, and Mexico.

A Business and Aviation Industry Advisory Board provides guidance on the needs of business, government and the aviation industry. The ABA program is accredited by the Council on Aviation Accreditation. Department-sponsored tutoring and labs are available through the Campus Student Success Center.

Dedicated faculty advisors assist ABA students in evaluating the many opportunities available to them in this program. Some courses may require prerequisite subject knowledge or particular class standing. Course descriptions, included in this catalog, should be reviewed prior to registering for classes, to ensure proper placement.

Aviation Business Administration

Bachelor of Science

Degree Requirements

The Bachelor of Science degree in Aviation Business Administration requires successful completion of a minimum of 120 credit hours, and is normally completed in eight semesters. Designed for students interested in obtaining a strong business foundation with emphasis on specific aviation applications, the student may select an Area of Concentration in Airport Management or General Management.

Students should declare their Area of Concentration at the beginning of their junior year. Students who want to specialize in more than one Area of Concentration may transfer up to 6 credit hours toward the second area of concentration. Students who participate in the Cooperative Education program may substitute up to 6 credit hours, if approved, toward the specified courses required in their Area of Concentration.

Students enrolled in the Air Force or Army ROTC program may substitute AF or MY courses for the open elective courses.

General Education	33
Program Support	15
Business Core	45
Area of Concentration	15
Open Electives	12
Total Degree Credits	**120**

General Education

Communication Theory and Skills*	9
Mathematics*	6
Computer Science*	3
Physical and Life Sciences* (One course must include a laboratory.)	6
Humanities Lower-Level course*	3
Social Sciences Lower-Level course*	3
Humanities/Social Sciences Upper-Level course	3
Total Credits	**33**

Program Support

Course		Title	Credits
AS	120	Principles of Aeronautical Science	3
EC	210	Microeconomics	3
EC	211	Macroeconomics	3
MA	211	Statistics with Aviation Applications -OR-	
MA	222	Business Statistics	3
MA	320	Decision Mathematics	3
Total Credits			**15**

Business Core

Course		Title	Credits
BA	201	Principles of Management	3
BA	210	Financial Accounting	3
BA	221	Advanced Computer Based Systems	3
BA	311	Marketing	3
BA	312	Managerial Accounting	3
BA	314	Human Resource Management	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	325	Social Responsibility and Ethics in Management	3
BA	332	Corporate Finance I	3
BA	335	International Business	3
BA	390	Business Law	3
BA	420	Management of Production and Operations	3
BA	436	Strategic Management	3
EC	315	Managerial Economics	3
Total Credits			**45**

Areas of Concentration

Airport Management:

Course		Title	Credits
BA	408	Airport Management	3
BA	412	Airport Planning and Design Standards	3
BA	418	Airport Administration and Finance**	3
BA/EC		Business Electives (300-400 level)	6
Total Credits			**15**

General Management:

The focus is to produce an aviation management generalist. The culminating focus course is BA 436.**

Select any five BA/EC 300-400 level courses	15
Open Electives	12
Total Degree Requirements	**120**

Academic Programs at the Prescott Campus

**These classes are considered the capstone class for the area of concentration.

Courses Available as BA 300-400 Business Electives

BA 308 Public Administration
BA 322 Aviation Insurance
BA 324 Aviation Labor Relations
BA 331 Transportation Principles
BA 405 General Aviation Marketing
BA 408 Airport Management
BA 410 Management of Air Cargo
BA 412 Airport Planning and Design Standards
BA 415 Airline Management
BA 418 Airport Administration and Finance
BA 419 Aviation Maintenance Management
BA 421 Small Business Management
BA 424 Project Management in Aviation Operations
BA 426 International Aviation Management
BA 427 Management of the Multicultural Work Force
BA 430 International Trade and Regulations
BA 449 Strategic Marketing Management
BA 450 Airline/Airport Marketing
EC 420 Economics of Air Transportation

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Mathematics, Computer Science, Physical and Life Sciences, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met with permission of advisor. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Aviation Business Administration vertical outline. Other courses may also be used with permission of the Undergraduate Program Coordinator.

Communication Theory and Skills

COM 122, 219, 221 -OR- 222

Computer Science

BA 120 -OR- IT 109

Humanities

LOWER-LEVEL: HU 140 series
UPPER-LEVEL: HU 300-400 level

Mathematics

MA 120, MA 220 -OR- MA 111, MA 112 -OR- MA 320

Physical and Life Sciences

PS 101-109, PS 111, PS 142, PS 302, PS 304,
PS 308, PS 309, PS 310, PS 312, PS 313, PS 403, WX 201

Social Sciences

LOWER-LEVEL:
PSY 220
SS 110-130, 204, 210
UPPER-LEVEL:
HF 300, PSY 350, SS 302-360

Suggested Program of Study

FRESHMAN YEAR

		Communication Theory and Skills*	3
		Lower-Level Humanities*	3
		Lower-Level Social Sciences*	3
		Computer Science*	3
		Mathematics*	6
		Physical and Life Sciences*	3
BA	201	Principles of Management	3
BA	221	Advanced Computer Based Systems	3
EC	210	Microeconomics	3
UNIV	101	College Success	(1)+
Total Credits			**30**

+ Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

		Communication Theory and Skills*	6
		Physical and Life Sciences*	3
AS	120	Principles of Aeronautical Science	3
BA	210	Financial Accounting	3
BA	311	Marketing	3
EC	211	Macroeconomics	3
MA	222	Business Statistics	3
MA	320	Decision Mathematics	3
		Open Elective	3
Total Credits			**30**

JUNIOR YEAR

		Upper-Level Humanities -OR- Social Sciences*	3
BA	312	Managerial Accounting	3
BA	314	Human Resource Management	3
BA	317	Organizational Behavior	3
BA	320	Business Information Systems	3
BA	332	Corporate Finance I	3
BA	335	International Business	3
EC	315	Managerial Economics	3
		Concentration Courses	3
		Open Elective	3
Total Credits			**30**

SENIOR YEAR

BA	325	Social Responsibility and Ethics in Management	3
BA	390	Business Law	3
BA	420	Management of Production and Operations	3
BA	436	Strategic Management	3
		Concentration Courses	12
		Open Electives	6
Total Credits			**30**

TOTAL DEGREE CREDITS **120**

Computer Science

Bachelor of Science

The curriculum for the Bachelor of Science degree in Computer Science is designed to give the student a state-of-the-art education in both the theory and practice of computer science. Integral to this, the degree offers a number of tracks in fields that interact with computer science and which employ many of our graduates. Tracks offered are in Aerospace Systems, Business, Intelligence and Security, Defense Studies, and Space Physics. The Bachelor of Science degree in Computer Science combines the rigor of a technical education with a considerable amount of flexibility, reflecting the multidisciplinary nature of modern technical careers.

The curriculum for the degree in Computer Science includes courses in discrete structures, computer organization, programming languages, algorithms, data structures, database systems, operating systems, human-computer interfaces, computer networks, and software engineering. The program provides a blend of theory and applications, preparing students for a variety of computer science and software engineering positions in scientific and business fields, and lays the foundation for graduate studies in computer science and related disciplines. Upper-level courses involve students in team projects that emphasize industrial processes and practices.

One of the goals of the curriculum is to enable students to apply knowledge gained in computer science coursework to specific areas outside computer science. This degree will enable students to study computer science while gaining a background in a field or industry heavily dependent on computer science. Typically the degree requires six courses in an area to provide an application domain for each student. This multidisciplinary degree satisfies the rigors of computer science while enabling students to gain depth in a related field and to bring computer technology to that area. The application tracks are listed below:

AEROSPACE SYSTEMS TRACK

AE	313	Space Mechanics
AE	427	Spacecraft Preliminary Design
EP	394	Space Systems Engineering
ES	207	Fundamentals of Mechanics
MA	243	Calculus and Analytical Geometry III
MA	345	Differential Equations and Matrix Methods

BUSINESS TRACK

BA	201	Principles of Management
BA	210	Financial Accounting
BA	311	Marketing
BA	421	Small Business Management
EC	210	Microeconomics
MA	320	Decision Mathematics

DEFENSE STUDIES TRACK

AF	401	Preparation for Active Duty
AF	402	Preparation for Active Duty
MA	320	Decision Mathematics
App. Elec.		Technical Elective*
App. Elec.		Technical Elective
App. Elec.		Technical Elective*

INTELLIGENCE AND SECURITY TRACK

MA	320	Decision Mathematics
SIS	312	Global Crime and Criminal Justice Systems
SIS	315	Studies in Global Justice
SIS/STG		Elective*
SIS/STG		Elective*
SIS/STG		Elective*

Academic Programs at the Prescott Campus

Space Physics Track

MA	243	Calculus and Analytical Geometry III
MA	345	Differential Equations and Matrix Methods
PS		Elective†
PS	303	Modern Physics
PS	401	Astrophysics
PS	408	Astrophysics II

* Computer Science Department Chair approval required

Degree Requirements

The Bachelor of Science degree can be earned in eight semesters assuming appropriate background and full-time enrollment. Successful completion of a minimum of 126 credit hours (128 credit hours for the tracks in aerospace systems and space physics) is required.

The first year of the program is the common first year engineering experience, which is required of all engineering and computer science majors. After that, the curriculum includes courses in general education, mathematics, science, and computing. The latter is divided into computing fundamentals, advanced concepts, applied computing, and software engineering. In addition, a student is required to take a sequence of courses in one of the following tracks: Aerospace Systems, Business, Defense Studies, Intelligence and Security, or Space Physics.

Students should be aware that because the tracks in Aerospace Systems and Space Physics require more coursework in mathematics than the other tracks, students electing either of these tracks should make that choice in their sophomore year. One of the goals of the Computer Science program is to prepare students to work as part of a team on the development of software systems; consequently, software engineering concepts are integrated throughout the curriculum.

Students should also be aware that most courses have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

FRESHMAN YEAR

Course		Title	Credits
COM		Communications	3
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Design Laboratory	1
EGR	101	Introduction to Engineering	2
EGR	115	Introduction to Computing for Engineers	3
HU	14X	Humanities	3
HU/SS		Lower-Level Humanities or Social Sciences	3
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
PS	150	Physics I for Engineers	3
PS	160	Physics II for Engineers	3
UNIV101		College Success	(1)+
Total Credits			**32**

+ Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
COM		Communications	3
CS	222	Introduction to Discrete Structures	3
CS	225	Computer Science II	4
CS	315	Data Structures and Analysis of Algorithms	3
MA		Track Dependent Mathematics	3/4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
SE	300	Software Engineering Practices	4
		Track Dependent Special Electives	6/7
Total Credits			**30/32**

Prescott Campus Academic Programs

JUNIOR YEAR

Course		Title	Credits
CEC	320	Microprocessor Systems	3
CEC	322	Microprocessor Systems Laboratory	1
COM		Communications	3
CS	317	Files and Database Systems	3
CS	332	Organization of Programming Languages	3
CS	375	Algorithms	3
EC/SS		Lower-Level Social Sciences*	3
SE	310	Analysis and Design of Software Systems	3
SE	320	Software Construction	3
		Track Dependent Specified Elective	6
Total Credits			**31**

SENIOR YEAR

Course		Title	Credits
CEC	470	Computer Architecture	3
CS/SE/CEC Elective (300/400 level)			3
CS	415	Human-Computer Interfaces	3
CS	420	Operating Systems	3
CS	425	Net-Centric Computing	3
HU/SS		Upper-Level Humanities or Social Sciences Elective*	6
MA	412	Probability and Statistics	3
SE	450	Software Team Project I	3
		Track Dependent Specified Elective	3
		Track Dependent Technical Elective	3
Total Credits			**33**

TOTAL DEGREE CREDITS **126/128**

*Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Computer Science vertical outline.

Communication Theory and Skills

COM 122, 219, 221, 222

Humanities

LOWER-LEVEL:
Any course in the HU series under 300
UPPER-LEVEL:
Any course in the HU series 300 or over

Social Sciences

LOWER-LEVEL:
EC 200, 210, 211
(EC 200 is not acceptable together with EC 210 or EC 211 or their equivalent.)
PSY 220
SS 110, 120, 130, 204, 210
UPPER-LEVEL:
EC 310, 312, 315, 420
HF 300
PSY 350
SS 302, 305, 310, 320, 325, 331, 335, 340, 350, 352, 360

GSIS, STG, and RS courses may be substituted for Humanities and Social Sciences courses at the appropriate level.

One Social Sciences course must be EC or STG 205.

Mathematics and Special Electives

All students are required to take at least one MA elective and five special electives that depend on the track in the program.

Aerospace Track:
AE 313, AE 427, EP 394, ES 207, MA 243, MA 345

Business Track:
BA 201, BA 210, BA 311, BA 421, EC 210, MA 320

Defense Studies Track:
AF 401, AF 402, MA 320, Technical Elective** Technical Elective**, Technical Elective**

Intelligence and Security Track:
MA 320, SIS 312, SIS 315, SIS 400

Space Physics Track:
MA 243, MA 345, PS 3XX, PS 303, PS 401, PS 408

** Technical Electives must be approved by the program coordinator.

† These electives must be approved by the Computer Science chair.

Global Security and Intelligence Studies

Bachelor of Science

The Bachelor of Science degree in Global Security and Intelligence Studies (GSIS) is designed to develop future security and intelligence professionals with a broad understanding of global interrelationships in politics, economics, social change, science and technology, military developments, systems of thought, public health, the psychological dimensions of military and terrorist threats, cyber-security, environmental issues, and human cultures, and the implications of these for the security of nation-states and the future of human society in a global context. The program provides the student with the interdisciplinary skills to analyze the interactions between all these elements and to communicate their ideas effectively in both written and oral contexts. Above all, GSIS students will be able to exhibit innovative problem-solving and critical-thinking skills in issues such as terrorism and asymmetrical warfare, transportation (especially aviation and aerospace) security, threats to corporate personnel and facilities, threats to computer and telecommunications infrastructure, trafficking networks in illicit services and substances, proscribed weapons technologies such as weapons of mass destruction, international crime, population migrations, natural disasters, pandemics, and homeland security.

Global Security and Intelligence Studies students will be very competitive to begin activities (a) with federal government security and intelligence agencies and other federal agencies with security and intelligence responsibilities and needs, (b) with the military services, (c) with security and intelligence departments in business and industry (especially aviation, aerospace, and other transportation entities), (d) with state and local law enforcement agencies, (e) as students in graduate schools specializing in international security studies and regional affairs, (f) as students in law schools, (g) in politics as leaders or as staffers specializing in security issues, and (h) as entrepreneurs.

Degree Requirements

The GSIS program consists of seven interrelated components: general education, a GSIS core, area of concentration, electives, foreign languages, senior thesis, and an optional co-op or study-abroad experience. The general education requirement provides the fundamentals in the sciences, mathematics, the social sciences and liberal arts, oral and written communication, and computers. The science requirement deepens the student's knowledge and understanding of science and technology, key areas for the security/intelligence student. Together, the GSIS core is a multidisciplinary array of courses that brings a number of fields to the study of security and intelligence, including geography, the law, economics, psychology, government and foreign policy, and the history of intelligence. The GSIS core and the designated electives are designed to demonstrate the ways in which societies and cultures, economies, systems of thought, military developments, and environmental concerns are shaping the international system.

In the senior year, the GSIS major will select one of two areas of concentration: Intelligence or Security. Each area of concentration contains five courses, allowing the student to gain a deeper understanding in a more specialized field. A third option for the area of concentration is to chose a total of five courses from both Intelligence and Security, two from one and three from the other. This would be counted as an area of concentration in Intelligence and Security.

Because knowledge of a second language—or indeed multiple languages—is an essential skill for the intelligence and security professional today, GSIS students must meet a foreign language requirement by demonstrating oral and reading competency in a language other than English, or by taking 12 credits of college-level foreign language courses in one language. GSIS students also are required to complete a senior thesis prior to graduation. The thesis will encompass significant research into a topic relevant to security and intelligence studies and provide original recommendations and conclusions. The GSIS program encourages students to gain international experience through travel or study abroad. It promotes a strong grounding in history, a capacity for critical thinking, good writing and communication skills, and, in the selection of designated and open electives, a knowledge and appreciation of the arts and humanities.

The Bachelor of Science degree in Global Security and Intelligence Studies (GSIS) requires successful completion of a minimum of 120 credit hours.

Bachelor of Science Degree in Global Security and Intelligence Studies

	Hours
General Education	39
GSIS Core	33
Area of Concentration	15
Foreign Language	12
GSIS Designated Electives	9
Open Electives	9
Senior Thesis	3
TOTAL DEGREE CREDITS	**120**

Global Studies Core Courses

Course		Title
EC	210	Microeconomics
SIS	100	Introduction to Global Security and Intelligence Studies
SIS	200	Introduction to the American Legal System
SIS	312	Global Crime and International Justice Systems
SIS	315	Studies in Global Intelligence I
SIS	325	History of Terrorism
SS	204	Introduction to Geography
SS	310	Personality Development
SS	320	American National Government
SS	325	International Studies
SS	340	American Foreign Policy

GSIS Areas of Concentration

Course		Title
INTELLIGENCE		
SIS	317	Political Change, Revolution, and War
SIS	323	Intelligence and Technology
SIS	328	Intelligence Analysis, Writing, and Briefing
SIS	400	International Security and Globalization
SIS	415	Studies in Global Intelligence II
SECURITY		
SIS	405	Environment and Security
SIS	410	Business Security and Competitive Intelligence
SIS	420	Aviation Security and Technology
SIS	422	Homeland Security and Technology
SIS	425	Personnel Security

Academic Programs at the Prescott Campus

GSIS Designated Electives

Course		Title
BA	335	International Business
EC	211	Macroeconomics
HU	341	World Philosophy
HU	345	Comparative Religions
HU	420	Applied Cross-Cultural Communication
PSY	350	Social Psychology
RS	305	Asian Literature
SIS	320	Topics in Global History, Politics, and Culture
SS	333	US-Asian Relations

Suggested Program of Study

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills	3
		Information Technology/ Computer Science	3
		Lower-Level Humanities	3
		Mathematics	3
		Physical Sciences *	3
SIS	100	Introduction to GSIS	3
SS	110	World History	3
		Foreign Language I	3
		Foreign Language II	3
SS	204	Introduction to Geography	3
UNIV	101	College Success	(1)+
Total Credits			**30**

+ Meets open elective or credit in excess of degree requirements

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills	6
		Upper-Level HU/SS/RS	3
		Mathematics	3
		Physical/Life Science (one lab)*	6
		Foreign Language III	3
		Foreign Language IV	3
EC	210	Microeconomics	3
SIS	200	Introduction to the American Legal System	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
		Physical/Life Sciences*	3
SIS	312	Global Crime and International Justice Systems	3
SIS	315	Studies in Global Intelligence I	3
		Designated Electives	9
SIS	325	History of Terrorism	3
SS	310	Personality Development	3
SS	320	American National Government	3
SS	325	International Studies	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
HU	480	Senior Thesis Research	1
HU	485	Senior Thesis Writing	2
SS	340	American Foreign Policy	3
		Area of Concentration	15
		Open Electives	9
Total Credits			**30**

TOTAL DEGREE CREDITS **120**

* Courses that satisfy the STG/GSIS science requirement:

Embry-Riddle Courses
All AE, EE, ES, HF, PSY, and PS courses, AS 309, AS 310, AS 357, WX 201, WX 352, CS 118, and CS 200 level and above courses.

Other Universities
Any college-level physical, life, geological, behavioral, engineering, computer, or environmental science.

Additional Embry-Riddle Science
SS 310, SS 350, and all of the above.

Science, Technology, and Globalization

Bachelor of Science

The Bachelor of Science degree in Science, Technology, and Globalization (STG) is designed to develop leaders and global citizens for the 21st century. Our graduates will be uniquely prepared to understand and function effectively in the global relationships among science, technology, economies, political systems, systems of thought, cultures, business practices, and natural environments. Our graduates will be able to secure positions in the fields of science and technology policy; management in high-tech industry; government and policy institutes; global air transport businesses; transnational technology projects and global technology consulting; environmental consulting; aviation regulation; and consultation to industry and government. STG students will specialize in one of two career tracks: Global Management or Global Aviation Ecology.

Degree Requirements

The STG program consists of eight interrelated components: general education, sciences, STG core, advanced STG areas of concentration, electives, foreign languages, senior thesis, and an optional co-op experience. The general education element provides the fundamentals in sciences, math, social sciences, computers, and communication. The science requirement further deepens the student's knowledge of and interaction with the sciences. The STG core is designed to demonstrate the ways in which societies, economies, systems of thought, environments, cultures, and policies shape and are being shaped by science, technology, and globalization. After the core, students will focus on one of two areas of global change -- Global Management or Global Aviation Ecology–by taking advanced STG courses and designated electives in these areas.

Because knowledge of a second language is an essential skill for today's global environment, STG students must meet a language requirement by demonstrating oral and reading competency in a language other than English, or by taking 12 credits of college-level foreign language courses. STG students are also required to complete a senior thesis prior to graduation. The thesis will be a living document in which students will link their STG academic work with their professional future. The Bachelor of Science degree in Science, Technology, and Globalization (STG) requires successful completion of a minimum of 120 credit hours.

Academic Programs at the Prescott Campus

Bachelor of Science Degree in Science, Technology, and Globalization

Courses	Hours
General Education	36
Additional Science	6
Open Electives	15-18
Senior Thesis	3
Foreign Languages	12
STG Core	24
STG Advanced Courses	12/15
STG Designated Electives	9
TOTAL DEGREE CREDITS	**120**

STG Core Courses

Course		Title
BA	201	Principles of Management
SIS	100	Introduction to Global Security and Intelligence Studies
SS	204	Introduction to Geography
STG	210	Global Problem Solving

ONE CLASS UNDER EACH MAJOR HEADING IS REQUIRED

Policy and Politics

Course		Title
SS	320	American National Government
SS	325	International Studies
STG	305	Global Policy Studies

Economics

Course		Title
EC	200	An Economic Survey
STG	205	Global Economics

Philosophy

Course		Title
HU	330	Values and Ethics
HU	341	World Philosophy
HU	345	Comparative Religions
SS	302	Evolution of Scientific Thought

History

Course		Title
HU	335	Technology and Modern Civilization
SIS	317	Political Change, Revolution, and War
SIS	320	Topics in Global History, Politics, and Culture

STG Advanced Courses

STG students must take all required courses from their selected Area of Concentration (AOC) plus one required course from the other AOC. Students must take 9 credits of designated STG electives.

Global Aviation Ecology

Course		Title
PS	309	Principles of Ecology
PS	403	Wildlife and Airports
SS	360	Environmental Law
STG	401	Environment and Culture

Global Management

Course		Title
BA	308	Public Administration
BA	436	Strategic Management
STG	325	Engineering Cultures

Suggested Program of Study

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills	3
		Computer Science	3
		Foreign Language I	3
		Foreign Language II	3
HU	140-146		3
		Mathematics	3
		Physical Sciences*	3
		Social Sciences	3
SIS	100	Introduction to GSIS	3
SS	204	Introduction to Geography	3
UNIV	101	College Success	(1)+
Total Credits			**30**

+Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
		Foreign Language III	3
		Foreign Language IV	3
		Physical Sciences*	3
BA	201	Principles of Management	3
COM	219	Speech	3
COM	221	Technical Report Writing	3
MA	222	Business Statistics	3
SIS	317	Political Change, Revolution, and War**	3
STG	205	Global Economics**	3
STG	210	Global Problem Solving*	3
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
		Physical Sciences*	6
HU/SS		Upper-Level Elective	3
HU	341	World Philosophy**	3
STG	305	Global Policy Studies**	3
STG		Advanced STG Course	6
STG		STG Designated Elective	3
		Open Elective	6
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
HU/SS		Upper-Level Elective	3
HU	480	Senior Thesis Research	1
HU	485	Senior Thesis Writing	2
STG		Advanced STG Courses	6-9
STG		STG Designated Electives	6
		Open Electives***	9-12
Total Credits			**30**

TOTAL DEGREE CREDITS **120**

* Courses that satisfy the STG/GSIS science requirement:

Embry-Riddle Courses
All AE, EE, ES, HF, PSY, and PS courses, AS 309, AS 310, AS 357, WX 201, WX 352, CS 118, and CS 200 level and above courses.

Other Universities
Any college-level physical, life, geological, behavioral, engineering, computer, or environmental science.

Additional Embry-Riddle Science

SS 310, SS 350, and all of the above.

** STG Core Courses

*** Students are encouraged to use their open elective credits to complete a minor in mathematics, computer science, or aviation safety.

Areas of Concentration

Global Aviation Ecology

We have designed this Area of Concentration like no other environmental program in the world. We are focused on making our students professionally successful and personally fulfilled while working at the intersection between technology and the environment. Aviation and aerospace industries, among the largest employers in North America, are burgeoning with exciting environment-related opportunities for our graduates. While helping these industries become environmentally aware and compliant, our STG-Environment students already advise business on crucial environmental issues through co-ops, internships, one-year jobs, and consulting projects that are part of our curriculum.

The environmental problems in aviation and aerospace are not easy to solve. They require a great deal of talent and creativity by managers, consultants, and experts such as the ones graduating from our program. STG-Environment graduates will provide unique solutions so the natural environment and industry can coexist. Our unique interdisciplinary courses and faculty give students precisely the knowledge and skills that they need to become environmental problem solvers. Designated electives in this area of concentration focus on environmental and biological issues.

Possible Designated Electives

Course		Title
BA	314	Human Resource Management
HU	420	Applied Cross-Cultural Communication
PS	111	Plant Biology
PS	112	Animal Biology
PS	142	Introduction to Environmental Science
PS	304	Environmental Science
PS	306	Consumer and Hazardous Waste
PS	308	Atmospheric Environmental Studies
PS	310	Air Quality and Sound Pollution
PS	311	Water Quality
PS	312	Plant Identification
PS	402	Environmental Quality Laboratory
SS	340	American Foreign Policy
WX	201	Meteorology I

Academic Programs at the Prescott Campus

Global Management

The Global Management area of the STG program prepares students for technology management and human resource management and consulting in industry and government. Students who choose this option will be well equipped to understand how corporate strategies and technological innovations interact and how they have an impact on labor, management, corporations, and what we understand as "work."

The Global Management area provides students with the interdisciplinary skills to analyze and work in the technological and human resource dimensions of global change, particularly in high-tech environments. STG students who select this area will be able to work at entry-level positions in technology policy and management in high-tech industry, government and policy institutes, global air transport businesses, transnational technology projects, and global technology consulting. Designated electives in this area of concentration focus on human resource management, international business, and policy.

Possible Designated Electives

Course		Title
BA	311	Marketing
BA	314	Human Resource Management
BA	317	Organizational Behavior
BA	331	Transportation Principles
BA	332	Corporate Finance I
BA	335	International Business
BA	408	Airport Management
BA	421	Small Business Management
BA	425	Trends and Current Problems in Air Transportation
BA	427	Management of the Multi-Cultural Work Force
HU	420	Applied Cross-Cultural Communication
PSY	350	Social Psychology
SS	340	American Foreign Policy
STG	320	Topics in Global History

Space Physics

Bachelor of Science in Space Physics

The Space Physics degree program is administered by the College of Arts and Sciences. The Bachelor of Science in Space Physics, offered only on the Prescott campus, is an applied physics program designed to prepare graduates to work in space- and aerospace-related industries. Students will explore the fundamental forces of nature through experimental investigation of atomic, nuclear, and elementary particle systems. They will study the “micro” and “macro” universe through the use of high-precision detectors. The Space Physics program currently has two areas of concentration: Astrophysics and Particle Physics and Cosmology, with two more areas of concentration (Remote Sensing and Exotic Propulsion Systems) planned for the future. Physics is the study of forces, space, and time at their most basic level and provides the foundation for all physical sciences. The combination of laboratory skills and fundamental scientific knowledge will prepare students to make discoveries that will promote the exploration of space and add to the body of knowledge in science. Because of the strong emphasis on experimental physics, the student will be well situated to enter a variety of fields including graduate programs.

Admission Requirements

To enter this program, students must have completed four years of high school science and mathematics, demonstrating a high level of competency. Successful candidates for this program will be prepared to enter Calculus I and General Chemistry.

Degree Requirements

The Bachelor of Science in Physics is a 120 credit hour program. The degree can be completed in eight semesters. The courses necessary to earn this degree are listed below.

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure that these requirements are met.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Humanities*	3
		Lower-Level Social Sciences*	3
CS	223	Scientific Programming in C	3
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
PS	150	Physics I for Engineers	3
PS	160	Physics II for Engineers	3
PS	210	Physics II Laboratory	1
PS	216	Physics I Laboratory	1
UNIV	101	College Success	(1)+
Total Credits			**31**

+ Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Open Electives*	6
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	105	General Chemistry	4
PS	220	Physics III Laboratory	1
PS	250	Physics III for Engineers	3
PS	303	Modern Physics	3
PS	305	Modern Physics Laboratory	1
Total Credits			**29**

Academic Programs at the Prescott Campus

JUNIOR YEAR

Course		Title	Credits
		Technical Elective*	3
		Open Electives*	6
EP	440	Engineering Electricity and Magnetism	3
EP	455	Quantum Physics	3
MA	441	Advanced Engineering Mathematics I	3
MA	442	Advanced Engineering Mathematics II	3
PS	320	Classical Mechanics	3
PS	401	Astrophysics I	3
PS	408	Astrophysics II**	3
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
		Technical Elective*	9
EP	400	Thermodynamics and Statistical Mechanics	3
EP	420	Planetary Science	3
HU		Upper-Level Humanities Elective	3
PS	400	Senior Physics Laboratory	3
PS	405	Atomic/Nuclear Physics	3
PS	410	Senior Physics Laboratory IIa**	3
SS		Upper-Level Social Sciences*	3
Total Credits			**30**
TOTAL DEGREE CREDITS			**120**

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Space Physics vertical outline.

Communication Theory and Skills

COM 122, 219, 221, 222, 351, 360

Humanities

LOWER-LEVEL:
HU 140-146
UPPER-LEVEL:
HU 300-400 level

Social Sciences

LOWER-LEVEL:
EC 200
PSY 220
SS 110, 120, 130, 204, 210
UPPER-LEVEL:
HU 300
PSY 350
SS 302, 305, 310, 320, 325, 331, 340, 350, 360

Technical Electives

EP 410
MA 412, 432, 443
Any upper-division PS courses including:
PS 301, 308, 399, 499

Students may take other HU/SS, CS, and EE courses with the approval of the department chair/program coordinator.

** The above vertical outline is for the Astrophysics option. Students wishing to take the Particle Physics and Cosmology option should substitute PS 412 (Particle Physics and Cosmology) for the PS 408 (Astrophysics II) course and substitute PS 414 (Senior Physics Laboratory IIb) for PS 410 (Senior Physics Laboratory IIa).

Academic Programs at the Prescott Campus

College of Aviation

Dr. Jackie Luedtke, Dean

The College of Aviation is composed of the departments of Aeronautical Science, Meteorology, and Safety Science, and of the Flight Department, the flight laboratory component for the Aeronautical Science degree.

The College offers undergraduate degree programs in Aeronautical Science, which combines flight training with academic preparation in the technical and managerial aspects of aviation, as well as Applied Meteorology. This approach to aviation education provides students an added value over traditional flight training programs by focusing on the skills and knowledge required in today's industry. Foundational skills in mathematics, physics, communications, and aeronautics, including FAA certification as a multi-engine instrument-rated pilot, make up the core of the Aeronautical Science degree. Professional-level aeronautical science and flight courses prepare the graduate for a career as a professional civil or military pilot. The program also provides a foundation for further development in aircraft safety and meteorology. The B.S. in Applied Meteorology meets all the requirements for undergraduate study in meteorology recommended by the American Meteorological Society, the National Weather Service, and the U.S. Air Force. Graduates also meet U.S. Office of Personnel Management Qualification Standards for the position of meteorologist.

The Prescott campus offers a B.S. in Aeronautics. The curriculum is designed to build on the aviation knowledge and skills students bring with them to campus. Additionally, the Prescott campus offers a B.S. in Safety Science. The curriculum is designed to provide a broad-based foundation in industrial safety principles with areas of concentration in Aviation Safety and/or Industrial Safety.

For the graduate student, the College of Aviation offers the Master of Science in Safety Science. This degree program provides the graduate with experiences to enhance the practice of occupational health and safety. The M.S. in Safety Science degree program prepares graduates for several professional job settings, such as director of safety in industry and government, operational and maintenance safety personnel, aviation or industrial safety personnel, flight safety personnel, and aircraft accident investigation.

The College has an enrollment of approximately 700 students and a fleet of 38 aircraft, including Cessna 172s, Cessna 182s, Piper Seminoles, and American Champion Decathlons. The College also has state-of-the-art Level 6 Cessna 172, and PA-44 flight training devices, and an Airbus A-320 simulator. Embry-Riddle has positioned the College of Aviation to serve its students with distinction while investigating and developing new education and programs for pilots, meteorologists, and safety and security professionals.

Academic Programs at the Prescott Campus

Aeronautical Science (Professional Pilot)

Bachelor of Science
Specialties: Airline Pilot, Commercial Pilot, Military Pilot

The Aeronautical Science degree program blends flight training with rigorous academic study in a unique manner that provides a strong foundation for a career as a leader in the aviation industry, including airlines, corporate and commercial aviation, or the military. This approach to aviation education gives the students an added value over traditional flight training programs by focusing on the skills and knowledge required by today's industry. The curriculum provides skills in mathematics, physics, communications, and aeronautics, including FAA certification as a multi-engine instrument-rated pilot. The last two years of matriculation include extensive professional-level Aeronautical Science and flight courses that prepare the graduate for a career as a professional pilot, including airline flight crew operations in multi-crewmember jet transport aircraft. Critical-thinking and problem-solving skills are developed via computer simulations in aircraft performance, navigation, and aircraft systems operation. Effective resource management, human factors, and safety awareness are constantly emphasized throughout the curriculum.

Degree Requirements

The Bachelor of Science degree in Aeronautical Science may be attained in eight semesters. To earn the degree, successful completion of a minimum of 120 credit hours is required. The purpose of the Aeronautical Science degree program is to prepare the graduate for a productive career as a professional pilot and responsible citizenship in support of aviation and aerospace industries. Upon completion of the curriculum, the student will possess an FAA Commercial Pilot Certificate with multi-engine and instrument ratings. Optional advanced flight training includes upset training, certification as a flight instructor and instrument flight instructor, and training as a flight crewmember in a jet transport aircraft.

Students pursuing the Aeronautical Science degree will select one of three specializations after matriculation. Students entering under this catalog may select from the Airline Pilot, Commercial Pilot, or Military Pilot specialization. Please see the section concerning the restrictions imposed by the Aviation Transportation and Security Act. All students must complete the general education courses, Aeronautical Science core courses, and the courses required to complete one specialization to earn the Aeronautical Science degree.

Academic Programs at the Prescott Campus

Bachelor of Science Degree in Aeronautical Science

	Hours
General Education	39
Aeronautical Science Core	54
Specialty Courses	27
Total Degree Credits	**120**

University General Education

Course		Title	Credits
		Communication Theory and Skills*	9
		Lower-Level Humanities*	3
		Lower-Level Social Sciences*	6
		Upper-Level Humanities or Social Sciences*	3
		Computer Science Elective*	3
		Management Elective*	3
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
PS	104	Technical Physics II with Laboratory	3
Total Credits			**39**

Aeronautical Science Core Courses

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
AS	232	Intermediate Aeronautics	3
AS	272	Advanced Aeronautics	2
AS	309	Aerodynamics	3
AS	310	Aircraft Performance	3
AS	311	Aircraft Engines-Turbine	3
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	356	Systems and Components	3
AS	357	Flight Physiology	3
AS	358	Advanced Avionics	3
AS	350	Domestic and International Navigation	3
AS	387	Crew Resource Management	3
AS	408	Flight Safety	3
AS	420	Flight Technique Analysis	3
FA	132	Commercial Pilot Flight I**	1
FA	133	Commercial Pilot Flight II**	1
FA	232	Commercial Pilot Flight III**	1
FA	272	Commercial Pilot Flight IV**	1
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**54**

Airline Pilot Specialty

Course		Title	Credits
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	380	Pilot Career Planning and Interviewing Techniques	1
AS	402	Airline Operations -OR-	
AS	410	Airline Dispatch Operations	3
AS	411	Jet Transport Systems	3
AS	435	Electronic Flight Management Systems	3
FA	420	Airline Flight Crew Techniques and Procedures	2
		Electives	12
Total Credits			**27**

Commercial Pilot Specialty

Course		Title	Credits
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	380	Pilot Career Planning and Interviewing Techniques	1
BA/STG	300/400 level		3
		Minor	9-18
		Electives	1-10
Total Credits			**27**

Military Pilot Specialty

Course		Title	Credits
AS	435	Electronic Flight Management Systems	3
SS	305	American Military History -OR-	
SS	340	American Foreign Policy	3
		ROTC	16
		Electives	5
Total Credits			**27**

Total Degree Credits for all Specialties **120**

Prescott Campus Academic Programs

Academic Programs at the Prescott Campus

Suggested Program of Study

Airline Pilot Specialty

The Airline Pilot Specialty is designed for students whose goal is to fly for a scheduled airline. The academic and flight courses are designed to provide exposure to procedures and operations consistent with those found at air carriers. The upper-level AS courses are very technical and provide the foundation for the capstone flight courses that are designed to be consistent with current airline transport pilot requirements.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Computer Science Elective*	3
		Lower-Level Humanities*	3
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
FA	132	Commercial Pilot Flight I**	1
FA	133	Commercial Pilot Flight II**	1
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
UNIV	101	College Success	(1)+
WX	201	Meteorology I	3
Total Credits			**29**

+ Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Social Sciences*	6
		Management Elective*	3
AS	232	Intermediate Aeronautics	3
AS	309	Aerodynamics	3
AS	357	Flight Physiology	3
FA	232	Commercial Pilot Flight III**	1
PS	104	Technical Physics II with Laboratory	3
WX	352	Meteorology II	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
		Upper-Level HU/SS Elective*	3
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	272	Advanced Aeronautics	2
AS	310	Aircraft Performance	3
AS	311	Aircraft Engines - Turbine	3
AS	356	Aircraft Systems and Components	3
AS	358	Advanced Avionics	3
AS	380	Pilot Career Planning and Interviewing Techniques	1
AS	350	Domestic and International Navigation	3
FA	272	Commercial Pilot Flight IV**	1
		Electives	3
Total Credits			**28**

SENIOR YEAR

Course		Title	Credits
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	387	Crew Resource Management	3
AS	402	Airline Operations -OR-	
AS	410	Airline Dispatch Operations	3
AS	408	Flight Safety	3
AS	411	Jet Transport Systems	3
AS	420	Flight Technique Analysis	3
AS	435	Electronic Flight Management Systems	3
FA	420	Airline Flight Crew Techniques and Procedures	2
		Electives	9
Total Credits			**32**

TOTAL DEGREE CREDITS **120**

Commercial Pilot Specialty

The Commercial Pilot Specialty is designed for pilots with career interests requiring a more flexible degree program. The Aeronautical Science core course integrity is maintained, while allowing greater opportunity for the selection of courses to meet the needs of corporate and other segments of the aviation industry not specifically addressed by the Airline Pilot or Military Pilot specialties. One minor must be completed to meet the degree requirements of this specialization.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Computer Science Elective*	3
		Lower-Level Humanities*	3
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
FA	132	Commercial Pilot Flight I**	1

Course		Title	Credits
FA	133	Commercial Pilot Flight II**	1
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
UNIV	101	College Success	(1)+
WX	201	Meteorology	3
Total Credits			**29**

+Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Social Sciences*	6
		Management Elective*	3
AS	232	Intermediate Aeronautics	3
AS	309	Aerodynamics	3
AS	357	Flight Physiology	3
FA	232	Commercial Pilot Flight III**	1
PS	104	Technical Physics II with Laboratory	3
WX	352	Meteorology II	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
		Upper-Level HU/SS Elective*	3
AS	254	Aviation Legislation -OR-	
AS	405	Aviation Law	3
AS	272	Advanced Aeronautics	2
AS	310	Aircraft Performance	3
AS	311	Aircraft Engines - Turbine	3
AS	356	Aircraft Systems and Components	3
AS	358	Advanced Avionics	3
AS	380	Pilot Career Planning and Interviewing Techniques	1
AS	350	Domestic and International Navigation	3
AS	387	Crew Resource Management	3
FA	272	Commercial Pilot IV**	1
Total Credits			**28**

SENIOR YEAR

Course		Title	Credits
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	408	Flight Safety	3
AS	420	Flight Technique Analysis	3
BA/STG	300/400 level		3
		Minor	9-18
		Electives	1-10
Total Credits			**32**

TOTAL DEGREE CREDITS **120**

Military Pilot Specialty

The Military Pilot Specialty is designed for pilots with career interests in the military. This specialty contains the core Aeronautical Science courses and includes other courses optimized for a career as a pilot with the military. The Aeronautical Science degree, Military Pilot specialty is not a part of any ROTC program at Embry-Riddle but is designed for optimum use of the credit earned in ROTC.

FRESHMAN YEAR

Course		Title	Credits
		Communication Theory and Skills*	3
		Computer Science Elective*	3
		Lower-Level Humanities*	3
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
FA	132	Commercial Pilot I**	1
FA	133	Commercial Pilot II**	1
MA	111	College Mathematics for Aviation I	3
MA	112	College Mathematics for Aviation II	3
PS	103	Technical Physics I with Laboratory	3
UNIV	101	College Success	(1)+
WX	201	Meteorology I	3
		ROTC	2
Total Credits			**31**

+ Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
		Communication Theory and Skills*	6
		Lower-Level Social Sciences*	6
AS	232	Intermediate Aeronautics	3
AS	309	Aerodynamics	3
AS	357	Flight Physiology	3
FA	232	Commercial Pilot Flight III**	1
PS	104	Technical Physics II with Laboratory	3
WX	352	Meteorology II	3
		ROTC	2
Total Credits			**30**

JUNIOR YEAR

Course		Title	Credits
		Management Elective*	3
AS	272	Advanced Aeronautics	2
AS	310	Aircraft Performance	3
AS	311	Aircraft Turbine Engines	3
AS	356	Aircraft Systems and Components	3

Academic Programs at the Prescott Campus

AS	358	Advanced Avionics	3
AS	350	Domestic and International Navigation	3
AS	387	Crew Resource Management	3
FA	272	Commercial Pilot IV**	1
		ROTC	6
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
		Upper-Level HU/SS Elective*	3
AS	340	Instructional Design in Aviation -OR-	
FA	417	Flight Instructor Rating**	3
AS	408	Flight Safety	3
AS	420	Flight Technique Analysis	3
AS	435	Electronic Flight Management Systems	3
SS	305	American Military History -OR-	
SS	340	American Foreign Policy	3
		Elective	5
		ROTC	6
Total Credits			**29**
Total Degree Credits			**120**

Aeronautical Science Notes

* Embry-Riddle courses in the general education categories of Communication Theory and Skills, Computer Science, Humanities, Social Sciences, and Management may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified in the Aeronautical Science vertical outline.

Communication Theory and Skills

COM: 122, 219, and 221, 222, or 410

Computer Science

IT 109 or CS 117 or 118

Humanities/Social Sciences

LOWER-LEVEL:
HU 140, 141, 142, 143, 144, 145, 146
PSY 220 and EC 200, SS 110, 120, 130, 204, or 210
(Military Pilot Specialty must take PSY 220 and SS 110, 120, or 130.)
UPPER-LEVEL:
HU/SS 300-400 level or
HF 300 or PSY 350

Management

BA 201

** Flight education is a continuous process that normally begins sometime during the student's first year of attendance and will progress until culminating in a multi-engine commercial certificate with an instrument rating. The curriculum is designed to allow students to meet core objectives in a reasonable amount of time.

Various factors influence students' progress. These factors include student academic preparation, student availability, student determination and dedication, the availability of aircraft and instructor pilots, and the cooperation of the weather. Consequently, some students will finish before others. After completing the core curriculum, students may take an additional semester or more to acquire additional, advanced certificates and ratings, including those for single-engine commercial, certified flight instructor airplane and instrument, and/or they may enroll in the Airline Flight Crew Simulation course.

After matriculating, all remaining FA courses required for the Aeronautical Science degree must be completed at Embry-Riddle or at another AABI-accredited college/university. Students who have begun training on an FAA certificate course prior to enrolling at Embry-Riddle may obtain written permission to complete that ONE course outside of Embry-Riddle. Courses for all other FAA certificates required for the Aeronautical Science degree must be completed at Embry-Riddle or at another AABI-accredited college or university. All students enrolled in the Aeronautical Science degree program must complete at least one flight course successfully at Embry-Riddle. All Embry-Riddle students must obtain written permission in advance for flight training outside of Embry-Riddle. See the Flight Department chair to obtain an Off Campus Flight Authorization Request form. All details regarding course and credit requirements and the approval process will be provided upon application. Students who have acquired FAA pilot certificates prior to enrolling at Embry-Riddle will receive credit for the appropriate courses and will be placed in the next sequential course in the degree program. See the Flight Department Chair concerning exact credit.

Enrollment in AS or FA courses requires proof of U.S. citizenship or a Department of Justice background check for international students. Please see the Aviation Transportation and Security Act under the Admission to the Residential Campuses section of this catalog.

Cooperative Education credits may be used as open electives.

Aircraft Dispatcher Certification Program

For the student interested in airline flight operations management, Embry-Riddle offers a program to prepare the student for Aircraft Dispatcher certification testing. Upon successful completion of the required curriculum and the FAA Dispatcher Written Examination, the student will be eligible to take the FAA Dispatcher Practical Test.

Licensed dispatchers are employed by airlines to manage the ground-based tasks vital to a successful airline flight. Dispatchers share responsibility with the captain for preflight planning and preparation of the dispatch release, and they are included in the decision loop on equipment failures, weather variations, or traffic delays for monitoring the progress of the flight, issuing safety-of-flight information to the crew, and canceling or redispatching the flight.

To carry out these tasks properly, dispatchers must be knowledgeable in aircraft performance capabilities, meteorology, operating regulations, air traffic control, and instrument flight procedures. They must also be able to make sound decisions that incorporate the company's economic and scheduling considerations

Certification Requirements

The Aircraft Dispatcher Certification program is available at the Prescott campus. Dispatcher preparation is based on the successful completion of the following courses and the applicable prerequisites.

Course		Title	Credits
AS	232	Intermediate Aeronautics	3
AS	350	Domestic and International Navigation	3
AS	310	Aircraft Performance	3
AS	410	Airline Dispatch Operations.*	3
AT	300	ATC in the National Aerospace System	3
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**21**

* AS 410 serves as the capstone course for the Aircraft Dispatcher program.

This program is offered in the pursuit of a degree and not as separate training. Qualification for FAA testing normally requires a minimum of six semesters of instruction. To complete the Aircraft Dispatcher Certification program, the student must earn a "C" grade or higher in all required courses. For more information, contact the Aeronautical Science Department.

Academic Programs at the Prescott Campus

Aeronautics

Bachelor of Science

The Aeronautics degree is designed specifically for students who work, have worked, or desire to work in aviation-related careers. For students with existing aviation-related knowledge and skills, this degree acknowledges a student's valuable acquired experience through the award of advance standing prior-learning credit. The curriculum then builds on those skills and knowledge. The program also provides an opportunity for students new to aviation to acquire aviation-specific knowledge through aviation-related coursework. This combination of a student's aviation learning, aviation courses, courses in business, computer sciences, economics, humanities, communications, social sciences, mathematics, and physical sciences, along with professional development elective courses and a minor course of study, will prepare graduates for a career in an aviation-related field.

Aviation Area of Concentration

The Aviation Area of Concentration is the degree component where students can select courses from various aviation-related fields. In addition, the AOC portion of the degree is where credit for prior aviation learning is applied. Thirty-six hours of credit are needed to satisfy the requirements of this portion of the Aeronautics degree. All or part of the credit needed for this degree requirement may be awarded based on prior aviation training or experience. To complete the AOC, in addition to any prior learning credit, students may select from courses in Aeronautical Science, Flight, Air Traffic Management, Safety (aviation-related), Aerospace Electronics, Applied Meteorology (aviation-related), Space Studies, or Security and Intelligence Studies.

Evidence of Prior Aviation Learning

Applicants who qualify for admission to and matriculate in the degree program may be eligible for credit for prior learning.

Applicants must be able to prove competence in an aviation occupation with authentic documentary evidence. Training and experience in closely related occupations can be combined.

Just as official transcripts are required to transfer credit from one university to another, original or authenticated documentation of prior learning from professional training and experience must be presented to qualify for Aviation Area of Concentration credit. Documentary evidence must be from objective third-party sources and clearly describe the applicant's professional training, duties, and achievements in detail. Advance standing credit will be awarded in accordance with the applicable Embry-Riddle Curriculum Manual.

Duplicate Credit

Many Embry-Riddle courses are designed to teach the same skills and knowledge that Aeronautics students have acquired through experience and training. Students who complete courses in the same aviation specialty for which they were granted Aviation Area of Concentration credit would be duplicating coverage of the same subject matter. Credit for completion of such courses will not be applied to degree requirements.

Credit for prior learning granted in the Aeronautics degree program is not transferable to any other Embry-Riddle degree program.

MINOR

Students must select and complete one minor field of study. Total credits within the minor will vary depending on which minor is chosen. Students typically select a minor that will enhance their aviation career. Courses required for the minor field of study may be used to fill Area of Concentration, Professional Development, or Open Elective degree requirements. See Minor Courses of Study in this catalog.

BACHELOR OF SCIENCE IN AERONAUTICS

The curriculum to be followed by each student will vary depending upon any AOC prior learning or transfer credits granted.

Aviation Area of Concentration 36
Advance standing credit and/or nonduplicating credit from AEL, AS, AT, FA, SF, SP, or WX courses.

Communication Theory and Skills* 9

Humanities/Social Sciences*. 12
Lower-Level Humanities Elective 3
Lower-Level Social Sciences Elective
(PSY 220 and/or Lower-Level SS) 6
Upper-Level HU or SS Elective 3
Computer Science Elective 3
Mathematics+ 6
College Algebra or higher level math 3
MA 112 College Mathematics for Aviation II -OR-
MA 222 Business Statistics -OR-
Upper-Level Mathematics 3
Physical Sciences + ... 6
Physical and Life Sciences Elective 3
(One course must include a laboratory).

Program Support 12
AS 254 Aviation Legislation 3
AS 405 Aviation Law 3
BA 201 Principles of Management -OR-
BA 210 Financial Accounting 3
EC 200 An Economic Survey -OR-
EC 210 Microeconomics -OR-
EC 211 Macroeconomics 3

Professional Development Electives 21
Select from upper-division (300-400) courses in AEL/AS/AT/BA/CS/EC/IT/LET/SF/SIS/STG/WX.

Open Electives 15

TOTAL DEGREE CREDITS 120

*Embry-Riddle courses in the general education categories of Communication Theory and Skills, Humanities, and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified in the Aeronautics vertical outline. Other courses may also be used with permission of the Undergraduate Program Coordinator.

Communication Theory and Skills

COM 122, 219, 221, 222

Humanities

HU 140 to HU 146

Social Sciences

LOWER-LEVEL: 100-200 level
UPPER-LEVEL: 300-400 level
HF 300, PSY 350

Dependent on the amount of upper-level Aviation Area of Concentration credit applied, some of the open or Communications/Humanities/Social Sciences electives in the B.S. degree may have to be 300-400 level courses to satisfy the graduation requirement of 39 credits of upper-level courses.

Cooperative Education credits may be used as open electives; however, assignments may not be in the student's occupational specialty.

Students need to ascertain Mathematics and Physical Sciences pre/corequisites that are required for other courses. For example, PS103/4 and MA 112 are required for many upper-division AS and WX courses.

Applied Meteorology

Bachelor of Science

The Bachelor of Science degree in Applied Meteorology provides a practical understanding of the physics and dynamics of the atmosphere and prepares the graduate for a range of meteorologist positions in government or industry. Students use a state-of-the-art Weather Center and computer-equipped classrooms to understand and forecast complex atmospheric phenomena such as severe thunderstorms, tornadoes, cyclones, fronts and jet streams, and learn about global climate and how it is changing. Emphasis is placed on applying theory to operational weather forecasting and decision making for weather-sensitive industries, including possible hands-on experience as a meteorology intern. The program prepares graduating students for careers as meteorologists with the government, military, television, or the private sector, or for graduate studies toward a career in research. All areas of concentration meet all the requirements for undergraduate study in meteorology recommended by the American Meteorological Society, the National Weather Service, and the U.S. Air Force. All graduates also meet U.S. Office of Personnel Management Qualification Standards for the position of meteorologist.

Degree Requirements

The Bachelor of Science degree in Applied Meteorology requires successful completion of a minimum of 120 credit hours and can be attained in eight semesters, as outlined below. Students must complete both general education courses and Applied Meteorology courses in order to graduate with a Bachelor of Science in Applied Meteorology. All students entering the Applied Meteorology program should have completed four years of high school science and mathematics. Proficiency in trigonometry and pre-calculus is essential to enter this program. Students should be prepared to enter Calculus I in their first semester.

Students should be aware that several courses in each academic year may have pre- or co-requisites. Check the course descriptions at the back of this catalog before registering for classes to ensure that these requirements are met. In particular, many courses have math prerequisites or co-requisites. Students should plan to begin the required math-calculus sequence as soon as they are eligible. Note that students completing the Research AOC will be eligible to declare a minor in Mathematics.

In addition, the meteorology (WX) courses in the junior and senior years are offered only once a year. Students must adhere to the separate fall and spring plan given below for these years. Failure to do this will result in graduation being delayed by one year.

There are three areas of concentration. The Research Area of Concentration is for non-flying, non-military students. The Meteorology with Flying Area of Concentration is for non-military students who wish to complete 15 credit hours of Flying and ground schools while earning the Applied Meteorology degree. The Military Meteorologist Area of Concentration is for the ROTC student. The area of concentration must be declared at the time of enrollment or during the first semester.

Areas of Concentration

RESEARCH AOC

FRESHMAN YEAR

Course		Title	Credits
AS	120	Principles of Aeronautical Science	3
COM	122	English Composition and Literature	3
HU	14x	Lower-Level Humanities	3
MA	222	Business Statistics	3
MA	241	Calculus and Analytical Geometry I	4
MA	242	Calculus and Analytical Geometry II	4
PS	150	Physics I for Engineers	3
PS	216	Physics I Laboratory	1
UNIV	101	College Success Seminar	(1)*
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**30**

*Meets open elective or credit in excess of degree requirement

SOPHOMORE YEAR

Course		Title	Credits
COM	219	Speech	3
COM	222	Business Communication	3
EC/SS		Lower-Level Economics -OR- Social Sciences Elective	3
EGR	115	Introduction to Computing for Engineers	3
MA	243	Calculus and Analytical Geometry III	4
PS	160	Physics II for Engineers	3
WX	261	Applied Climatology	3
WX	353	Advanced Meteorology I	3
WX	363	Thunderstorms	3
WX	365	Satellite and Radar Weather Interpretation	3
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
FALL			
MA	345	Differential Equations and Matrix Methods	4
		SS 1xx/2xx SS Lower-Level Elective	3
WX	320	Atmospheric Thermodynamics	3
WX	354	Advanced Meteorology II	3
		Open Elective (if no Co-op)	(3)
SPRING			
MA	441	Advanced Engineering Mathematics	3
WX	355	Weather Analysis	5
WX	390	Atmospheric Physics	3
		Open Elective (if no Co-op)	(3)
SUMMER			
CE AAS		Co-op/Internship (or Fall/Spring Open Electives)	6
Total Credits			**30**

SENIOR YEAR

Course		Title	Credits
FALL			
HU/SS	300/400	Upper-Level Elective	3
WX	270	Weather Information Systems	3
WX	427	Forecasting Techniques	3
WX	490	Dynamic Meteorology I	3
		Open Elective	3
SPRING			
WX	457	Weather Operations Seminar	3
WX	491	Dynamic Meteorology II	3
		Open Electives	8
Total Credits			**29**
TOTAL DEGREE CREDITS			**120**

APPLIED METEOROLOGY WITH FLYING AOC

FRESHMAN YEAR

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
COM	122	English Composition and Literature	3
FA	132	Commercial Pilot Flight I	1
FA	133	Commercial Pilot Flight II	1
MA	241	Calculus and Analytical Geometry I	4
MA	242	Calculus and Analytical Geometry II	4
PS	150	Physics I for Engineers	3
PS	216	Physics I Laboratory	1
UNIV	101	College Success Seminar	(1)*
WX	201	Meteorology I	3
WX	352	Meteorology II	3
Total Credits			**29**

*Meets open elective or credit in excess of degree requirement

SOPHOMORE YEAR

Course		Title	Credits
AS	232	Intermediate Aeronautics	3
EGR	115	Introduction to Computing for Engineers	3
FA	232	Commercial Pilot Flight III	1
HU	14x	Lower-Level Humanities	3
MA	243	Calculus and Analytical Geometry III	4
PS	160	Physics II for Engineers	3
WX	261	Applied Climatology	3
WX	353	Advanced Meteorology I	3
WX	363	Thunderstorms	3
WX	365	Satellite and Radar Weather Interpretation	3
Total Credits			**29**

Academic Programs at the Prescott Campus

JUNIOR YEAR

Course	Title	Credits
FALL		
AS 272	Advanced Aeronautics	2
FA 272	Commercial Pilot Flight IV	1
MA 345	Differential Equations and Matrix Methods	4
EC/SS	Lower-Level Elective	3
WX 320	Atmospheric Thermodynamics	3
WX 354	Advanced Meteorology II	3
SPRING		
COM 219	Speech	3
MA 222	Business Statistics	3
WX 355	Weather Analysis	5
WX 390	Atmospheric Physics	3
Total Credits		**30**

SENIOR YEAR

Course	Title	Credits
FALL		
EC/SS	Lower-Level Economics or Social Sciences Elective	3
WX 270	Weather Information Systems	3
WX 427	Forecasting Techniques	3
WX 490	Dynamic Meteorology I	3
	Open Electives	4
SPRING		
COM 222	Business Communication	3
HU/SS	3XX/4XX Upper-Level Elective	3
WX 457	Weather Operations Seminar	3
WX 491	Dynamic Meteorology II	3
	Open Electives	4
Total Credits		**32**

TOTAL DEGREE CREDITS 120

MILITARY METEOROLOGIST AOC

FRESHMAN YEAR

Course	Title	Credits
COM 122	English Composition and Literature	3
HU 14X	Lower-Level Humanities	3
MA 241	Calculus and Analytical Geometry I	4
MA 242	Calculus and Analytical Geometry II	4
PS 150	Physics I for Engineers	3
PS 216	Physics I Laboratory	1
COM 219	Speech	3
UNIV 101	College Success Seminar	(1)*
WX 201	Meteorology I	3
WX 352	Meteorology II	3
	ROTC	2
Total Credits		**29**

* Meets open elective or credit in excess of degree requirement

SOPHOMORE YEAR

Course	Title	Credits
COM 222	Business Communication	3
EC/SS	Lower-Level Economics -OR- Social Sciences Elective	3
EGR 115	Introduction to Computing for Engineers	3
MA 243	Calculus and Analytical Geometry III	4
PS 160	Physics II for Engineers	3
WX 261	Applied Climatology	3
WX 353	Advanced Meteorology I	3
WX 363	Thunderstorms	3
WX 365	Satellite and Radar Weather Interpretation	3
	ROTC	2
Total Credits		**30**

JUNIOR YEAR

Course	Title	Credits
FALL		
MA 345	Differential Equations and Matrix Methods	4
EC/SS	Lower-Level Elective	3
WX 320	Atmospheric Thermodynamics	3
WX 354	Advanced Meteorology II	3
	ROTC	3
SPRING		
MA 222	Business Statistics	3
WX 355	Weather Analysis	5
WX 390	Atmospheric Physics	3
	ROTC	3
Total Credits		**30**

SENIOR YEAR

Course	Title	Credits
FALL		
WX 270	Weather Information Systems	3
WX 427	Forecasting Techniques	3
WX 490	Dynamic Meteorology I	3
	ROTC	3
	Open Electives	4
SPRING		
HU/SS	Upper-Level Elective	3
WX 457	Weather Operations Seminar	3
WX 491	Dynamic Meteorology II	3
	Open Electives	3
	ROTC	3
Total Credits		**31**

TOTAL DEGREE CREDITS 120

Academic Programs at the Prescott Campus

College of Engineering

Dr. Don Rabern, Dean

The College of Engineering offers three complementary programs, all focused on the aerospace industry. Aerospace, computer, and electrical engineers often are the primary team members in the design, analysis, or refurbishment of aircraft, spacecraft, missiles, rockets, and the ground-based systems that support their operations. The strength of the college is built on this combination of disciplines focused on aerospace platforms. Aerospace Engineering concentrates its efforts in space systems, structures, propulsion, and aerodynamics. Computer Engineering focuses on the design and development associated with computer hardware, including chips and circuits, and with the analysis, design, and development of mission-critical software systems employed in these devices. Electrical Engineering focuses on electrical systems, controls, and communications. The philosophy of our college is to give students a broad background, enabling them to pursue careers in many technical areas, but we choose to use aerospace as our vehicle to demonstrate the exciting, creative, and technical aspects of these engineering disciplines.

With this in mind, our mission is to provide undergraduate education founded on a rigorous, applied treatment of engineering fundamentals coupled with modern engineering tools. The College of Engineering is dedicated to providing excellence in aviation and space education, based in aerospace, electrical, and computer engineering, demonstrated through quality teaching, scholarly activity, facilities, and curriculum. Our engineering programs are recognized for their strong emphasis and rigor in engineering science and design founded on hands-on laboratory-based education. The college's vision is to contribute well-prepared professionals for early success in the industry or in graduate school. Our faculty is dedicated to educating engineers for the 21st century without forgetting the lessons of the 20th century.

The College of Engineering embraces the philosophies of the Accreditation Board of Engineering and Technology (ABET). We have established objectives for our graduating students and alumni to prepare them for a career in the industry or ingraduate school. Along with these objectives we have established outcomes we expect from our students through graduation. Those outcomes are listed below.

1. Our graduating students will have experienced a core of humanities, social sciences, and communications and demonstrate the use of this core to enhance the technical content of their engineering curriculum.
2. Graduating seniors will be competent in fundamental math and basic science subjects.
3. All graduating engineering students will be competent in a subgroup of core engineering fundamentals appropriate to their discipline.

Academic Programs at the Prescott Campus

Program	Core Topics
Aerospace Engineering (Aeronautics Option)	Aerodynamics Thermal Sciences Structures Flight Mechanics Aircraft Design Propulsion Electronics Aerospace Materials Astronautics
Aerospace Engineering (Astronautics Option)	Astrodynamics Attitude Dynamics and Control Structures Rocket Propulsion Spacecraft Design Thermal Sciences Aeronautics Space Systems Space Environment Effects Aerospace Materials and Design
Electrical Engineering	Analog/Digital Circuits Electronic Devices Controls Electromagnetics Power Conversion Telecommunications Hardware and Software Systems Design
Computer Engineering	Electrical Circuits Electronics, Controls Logic Circuits Computer Architecture Computer Operating Systems Algorithms and Data Structures Design

Academic Programs at the Prescott Campus

4. Engineering students graduating from our programs will demonstrate proficiency in core topics in their program listed below.
5. Graduating students will have had the opportunity to specialize and demonstrate competence in a sub-discipline in their chosen field, to provide depth in a subject area or prepare them for graduate education.
6. All engineering students will be proficient in engineering design.
7. All engineering students will demonstrate design competence through a major design (capstone) experience focused on designing a project, device, system, or process incorporating engineering standards and realistic constraints.
8. All engineering students will be proficient in modern laboratory techniques and state-of-the-art computer technology.

Entering students will find that the first-year engineering program is designed to prepare them for entry into the degrees offered by the College of Engineering. The first-year curriculum allows engineering students to take coursework that is common to every engineering degree in the College, allowing students flexibility in choosing engineering degrees without affecting the progress toward graduation.

It is the goal of the College of Engineering that normal incoming freshmen be able to complete their baccalaureate studies in four years. Depending on preparation and the time committed to classes, students may be able to graduate more quickly than that or it may take them longer. The nominal four-year program assumes that students arrive here having mastered trigonometry, two years of algebra, and one year of high school physics. Because communication skills are vital to all modern engineering disciplines, entering students should have a strong background in English composition.

The College of Engineering is proud of its programs. Industry praises the quality of our graduates, and graduate schools welcome our students. The following sections provide specific information on each degree program. Details on the content and emphasis of the degree and the degree requirements are shown. Please remember that questions regarding the degree programs are always welcome. Please feel free to contact the Admissions office, the College of Engineering, or the individual departments directly.

FIRST-YEAR ENGINEERING

The First-Year Engineering Program is designed to introduce students to the interdisciplinary aspects of engineering. Engineering courses, mathematics, computing, and physics courses are integrated to prepare students to work in teams for solving aerospace problems that reach across the broad areas of engineering. The first year for all engineering students is outlined below.

FIRST-YEAR ENGINEERING PROGRAM

Course	Title	Credits
CEC 220	Digital Circuit Design	3
CEC 222	Digital Circuit Laboratory	1
COM 122	English Composition and Literature I	3
EGR 101	Introduction to Engineering	2
EGR 115	Introduction to Computing for Engineers	3
HU 14X	Humanities	3
HU/SS	Lower-Level Humanities or Social Sciences Elective	3
MA 241	Calculus and Analytical Geometry I	4
MA 242	Calculus and Analytical Geometry II	4
PS 150	Physics for Engineers I	3
PS 160	Physics for Engineers II	3
UNIV 101	College Success	(1)*
Total Credits		**32**

* In excess of degree requirements.

Aerospace Engineering

Bachelor of Science

The Bachelor of Science degree in Aerospace Engineering provides a broad exposure to engineering fundamentals and prepares the graduating student for a wide range of engineering positions in industry or government. The program also is an excellent preparation for graduate school in a number of disciplines. The program's focus is primarily on the engineering of mission-oriented vehicles for atmospheric and space flight. In addition to the general education requirements, the student will study aerodynamics, structures, propulsion, space systems, controls, materials, instrumentation, electrical fundamentals, computer applications, orbital mechanics, and design. Students choose to integrate their knowledge in either an aircraft or spacecraft capstone design project. Design projects in a number of courses will develop and refine the students' ability to integrate their knowledge, communicate both verbally and in writing, and work in a team environment. A large number of hands-on experiences will expose the student to practical engineering to balance the theoretical analysis required to understand aircraft and spacecraft systems.

Outcomes (expectations of students graduating from our programs) common for all engineering programs are highlighted in the Engineering section of the catalog. Specific objectives for the Aerospace Engineering program include:

1. Alumni will demonstrate skills in math, science, and engineering fundamentals. This includes competence in the fundamental engineering areas that include statics, dynamics, circuits, materials science, fluid mechanics, thermodynamics, and experimental techniques and instrumentation. Students will also use modern and appropriate software that enable analysis, simulation, and design of aerospace systems.
2. Alumni working in the engineering field will demonstrate an understanding and philosophy that promote engineering practices founded in technical integrity, ethics, social and environmental responsibility, and global awareness.
3. Alumni will demonstrate the ability to assimilate topics from multiple sources and design a system. They will have a broad understanding of the interrelations of the aerospace disciplines and their impact on aerospace designs. They will understand the importance of teamwork and communications and bring design expertise to the workplace.
4. Alumni will demonstrate depth in their discipline in structures, aeronautics, propulsion, or astronautics and have depth in theoretical, computational, and experimental methods.

These objectives coupled with outcomes are extensive and form the foundation of the program. We ask a lot from our students and faculty. The commitment a student makes in the program and consequently the skills they bring to the workforce are substantial and are required to be among the best in the industry.

Academic Programs at the Prescott Campus

Degree Requirements

The Bachelor of Science in Aerospace Engineering program requires successful completion of a minimum of 129 credit hours. The program may be completed in eight semesters assuming appropriate background and full-time enrollment. A minimum cumulative grade point average of 2.00 is needed for all required AE, EGR, EP, and ES courses, excluding technical electives. The courses necessary to earn this degree are listed below.

Students should be aware that many courses have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure required sequencing. Students should note that a grade of C or better is required in MA and PS courses for entry into AE and ES courses.

FRESHMAN YEAR

Course		Title	Credits
		Humanities -OR- Social Sciences*	3
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Laboratory	1
COM	122	English Composition and Literature	3
EGR	101	Introduction to Engineering	2
EGR	115	Introduction to Computing for Engineers	3
HU	14x	Lower-Level Humanities*	3
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
PS	150	Physics I for Engineers	3
PS	160	Physics II for Engineers	3
UNIV	101	College Success	(1)**
Total Credits			**32**

** In excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
COM	219	Speech	3
COM	221	Technical Report Writing	3
EGR	200	Computer Aided Conceptual Design of Aerospace Systems	3
ES	201	Statics	3
ES	202	Solid Mechanics	3
ES	204	Dynamics	3
ES	206	Fluid Mechanics	3
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	220	Physics III Laboratory	1
PS	250	Physics III for Engineers	3
Total Credits			**33**

JUNIOR YEAR (AERONAUTICS OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	302	Aerodynamics II	3
AE	304	Aircraft Structures I	3
AE	314	Experimental Aerodynamics	1
AE	315	Experimental Aerodynamics Laboratory	1
AE	404	Aircraft Structures II	3
AE	413	Airplane Stability and Control	3
EC/STG		Lower-Level Economics*	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
PS	105	General Chemistry I	4
Total Credits			**33**

JUNIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
AE	301	Aerodynamics I	3
AE	304	Aircraft Structures I	3
AE	313	Space Mechanics	3
AE	325	Experimental Space Systems Engineering	1
AE	326	Experimental Space Systems Engineering Laboratory	1
EC/STG		Lower-Level Economics*	3
EP	394	Space Systems Engineering	3
ES	305	Thermodynamics	3
ES	320	Engineering Materials Science	2
ES	321	Engineering Materials Science Laboratory	1
EE	335	Electrical Engineering I	2
EE	336	Electrical Engineering I Laboratory	1
MA	441	Advanced Engineering Mathematics I	3
PS	105	General Chemistry I	4
Total Credits			**33**

SENIOR YEAR (AERONAUTICS OPTION)

Course		Title	Credits
		Upper-Level Humanities -OR- Social Sciences*	3
		Technical Electives	6
AE	313	Space Mechanics	3
AE	408	Turbine and Rocket Engines	3
AE	416	Aerospace Structures and Instrumentation	1
AE	417	Aerospace Structures and Instrumentation Laboratory	1
AE	420	Aircraft Preliminary Design	4
AE	421	Aircraft Detail Design	4
AE	430	Control Systems Analysis and Design	3
MA	441	Advanced Engineering Mathematics I	3
Total Credits			**31**

SENIOR YEAR (ASTRONAUTICS OPTION)

Course		Title	Credits
		Upper-Level Humanities -OR- Social Sciences*	3
		Technical Electives	6
AE	404	Aircraft Structures II	3
AE	414	Space Propulsion	3
AE	426	Spacecraft Attitude Dynamics and Control	3
AE	427	Spacecraft Preliminary Design	4
AE	430	Control Systems Analysis and Design	3
AE	445	Spacecraft Detail Design	4
AE	416 and 417	Aerospace Structures and Instrumentation	2
Total Credits			**31**
TOTAL DEGREE CREDITS			**129**

Technical Electives:

AE: 350, 395, 399††, 401, 407, 409, 411, 415, 425, 433, 495, 499††, 5XX
CEAE: With prior approval of the Aerospace Engineering Department.
CS: 325, 335, 344, 350, 420
EP: 320, 394, 410, 420, 455
ES: 306, 315, 395, 399††, 403, 412, 495, 499††
MA: 412, 432, 438, 442, 443, 5XX
PS: 301, 303, 320, 401, 405
EE: 303, 340, 406, 410
SE: 300

†† Must be approved by the Aerospace Engineering Department before taking this course.

Students may substitute upper-level AF and MY courses or aeronautical certificates for the 6 credits of technical electives.

General Education Electives

* Embry-Riddle courses in the general education categories of Humanities, and Social Sciences may be chosen as specified below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Aerospace Engineering vertical outline.

Humanities

LOWER-LEVEL: Any HU course under 300 level.

UPPER-LEVEL: Any HU course equal to or above 300 level.

Social Sciences

LOWER-LEVEL: Any SS course under 300 level or STG 210.

UPPER-LEVEL: Any SS course equal or above 300 level.

Economics

LOWER-LEVEL:

Any EC course under 300 level or STG 205.

Lower-level PSY and RS courses may be substituted for lower-level Humanities and Social Sciences courses. Upper-level EC, RS, and STG courses may be substituted for upper-level Humanities and Social Sciences courses. Language courses must not be the student's native language. Any substitutions for general education electives must be approved by the Aerospace Engineering Department Chair.

Computer Engineering

Bachelor of Science

The Bachelor of Science degree in Computer Engineering provides the student with the opportunity to acquire a broad background in computing, programming languages, circuit theory, computer design, telecommunication systems, embedded control systems, real-time systems, and software engineering. The curriculum includes courses in general education, computer science, software engineering, electrical engineering, and the capstone sequence of senior design classes.

This added emphasis on real-time embedded control systems and hardware/software interfaces places the Computer Engineering program in a unique position to increase employment opportunities after graduation. In addition, the program includes significant project work that is designed to prepare students to work as part of a team on the development of complex systems including both software and hardware. It allows the student opportunities to build capabilities in teamwork, designing to requirements, and quality assurance techniques.

The overall objective of the Computer Engineering program at Prescott is to produce graduates who will be successful practitioners of computer engineering. The program objectives to accomplish this goal are:

I. Math, Science, and Engineering Fundamentals

Alumni working in the engineering field will demonstrate skills in math, science, and engineering, with an emphasis on solving problems using fundamental engineering principles, including engineering logic, traditional analytical methods, modern software, and experimental verification of analytical methods. Additionally and more specifically, alumni will be

1. able to apply mathematically based physical laws to solve problems presented to them.
2. able to use or learn to use software tools and programming.
3. competent in the fundamental areas of digital and computer systems, software development, and modeling of physical systems.

II. Social Context of Engineering Practice

Alumni working in the engineering field will demonstrate an understanding and philosophy that promotes engineering practice founded in technical integrity, ethics, social and environmental responsibility, and global awareness. Alumni will recognize the importance of preparing themselves for continued education and independent thought.

III. Design and Teamwork

Alumni working in the engineering field will demonstrate the ability to assimilate topics from multiple sources, design a system or process, communicate that design effectively though verbal and written means, and work effectively on a team. They will also be cognizant of engineering project management. Alumni will

1. foster a sense of citizenship, positive group dynamics, team participation, and team responsibility in a global community and economy.

2. demonstrate leadership where appropriate in their work groups.
3. be able to plan, schedule, and carry out projects assigned to them.
4. be able to work together on an interdisciplinary team such as found in the aerospace culture.

IV. Discipline Specific Depth

Alumni working in the engineering field will demonstrate depth in their discipline and exposure in related areas. They will

1. have depth in embedded and real-time control systems, software design, or computer architecture.
2. show an aptitude for independent work while accomplishing the tasks they are assigned.
3. demonstrate an ability to develop a deeper understanding of a particular area of CE or to learn about a new area.

The Computer Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Telephone: (410) 347-7700.

Degree Requirements

The Bachelor of Science in Computer Engineering can be earned in eight semesters assuming appropriate background and full-time enrollment. Successful completion of a minimum of 128 credit hours is required.

Students should be aware that several courses in each academic year may have prerequisites and/or corequisites. Check the course descriptions at the back of this catalog before registering for classes to ensure requisite sequencing.

Suggested Program of Study

FRESHMAN YEAR

Course	Title	Credits
	Lower-Level Humanities -OR- Social Sciences*	3
CEC 220	Digital Circuit Design	3
CEC 222	Digital Circuit Laboratory	1
COM 122	English Composition and Literature	3
EGR 101	Introduction to Engineering	2
EGR 115	Introduction to Computing for Engineers	3
HU 14x	Lower-Level Humanities*	3
MA 241	Calculus and Analytic Geometry I	4
MA 242	Calculus and Analytic Geometry II	4
PS 150	Physics I for Engineers	3
PS 160	Physics II for Engineers	3
UNIV 101	College Success	(1)+
Total Credits		**32**

* Meets open elective or credit in excess of degree requirements.

SOPHOMORE YEAR

Course	Title	Credits
	Lower-Level Humanities -OR- Social Sciences*	3
CEC 320	Microprocessor Systems	3
CEC 322	Microprocessor Systems Laboratory	1
COM 219	Speech	3
CS 222	Introduction to Discrete Structures	3
CS 225	Computer Science II	4
EE 200	Engineering Software Tools	1
EE 223	Linear Circuit Analysis I	3
EE 224	Electrical Engineering Laboratory I	1
MA 243	Calculus and Analytic Geometry III	4
MA 345	Differential Equations and Matrix Methods	4
PS 250	Physics III for Engineers	3
PS 253	Physics III Laboratory for Engineers	1
Total Credits		**34**

JUNIOR YEAR

Course	Title	Credits
CEC 460	Telecommunications Systems	3
COM 221	Technical Report Writing	3
CS 420	Operating Systems	3
EE 300	Linear Circuits Analysis II	3
EE 302	Electronic Devices and Circuits	3
EE 303	Signals and Filters	3
MA 412	Probability and Statistics	3
SE 300	Software Engineering Practices	4
	Open Elective	3
	Technical Elective**	3
Total Credits		**31**

Academic Programs at the Prescott Campus

SENIOR YEAR

Course		Title	Credits
		Upper-Level Humanities -OR- Social Sciences*	3
CEC	420	Computer Systems Design	3
CEC	421	Computer Systems Design II	3
CEC	450	Real Time Systems	3
CEC	470	Computer Architecture	3
EC	2XX	Economics	3
EE	401	Control Systems Analysis and Design	3
EE	402	Control Systems Laboratory	1
HU	330	Values and Ethics	3
		Open Elective	3
		Technical Elective**	3
Total Credits			**31**
TOTAL DEGREE CREDITS			**128**

* Embry-Riddle courses in the general education categories of Humanities and Social Sciences may be chosen from those listed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Computer Engineering vertical outline.

Humanities

LOWER -LEVEL:
Any course in the HU series under 300 level.
UPPER-LEVEL:
Any course in the HU series equal to or above 300 level.

Social Sciences

LOWER-LEVEL:
Any SS course under 300 level or PSY 220
UPPER-LEVEL:
Any SS or EC course equal to or above 300 level, HF 300 or PSY 350.
STG and RS courses may be substituted for Humanities and Social Sciences at the appropriate levels.

** Technical electives include any AE, CE, CS, EE, ES, MA, or PS course above the 300 level or other courses approved by the CE department chair.

The Computer Engineering degree includes a space option in which AE 427 and AE 445 substitute for CEC 420 and CEC 421 and EP 394 is taken as one of the technical electives.

Electrical Engineering

Bachelor of Science

The Bachelor of Science degree in Electrical Engineering provides the student with the opportunity to acquire a broad background in circuit theory, communication systems, computers, control systems, electromagnetic fields, energy sources and systems, and electronic devices. The student also gains specialization in avionics appropriate for entry-level engineering positions in the aerospace industry. Emphasis on design places the Embry-Riddle Electrical Engineering student in a unique position to increase employment opportunities after graduation.

The overall objective of the Electrical Engineering program at Prescott is to produce graduates who will be successful practitioners of electrical engineering. The program objectives to accomplish this are:

I. Math, Science, and Engineering Fundamentals

Alumni working in the engineering field will demonstrate skills in math, science, and engineering, with an emphasis on solving problems using fundamental engineering principles, including engineering logic, traditional analytical methods, modern software, and experimental verification of analytical methods. Alumni will be

1. competent in the fundamental areas of statics/dynamics, thermo/heat transfer, and digital/linear circuits as appropriate for a generalized systems education.
2. able to use or learn to use software tools and programming
3. able to apply mathematically based physical laws to solve problems presented to them.

II. Social Context of Engineering Practice

Alumni working in the engineering field will demonstrate an understanding and philosophy that promote engineering practices founded in technical integrity, ethics, social and environmental responsibility, and global awareness. Alumni will recognize the importance of preparing themselves for continued education and independent thought.

III. Design and Teamwork

Alumni working in the engineering field will demonstrate the ability to assimilate topics from multiple sources, design a system or process, communicate that design effectively through verbal and written means, and work effectively on a team. They will also be cognizant of engineering project management. Alumni will

1. foster a sense of citizenship, positive group dynamics, team participation, and team responsibility in a global community and economy.
2. demonstrate leadership where appropriate in their work groups.
3. be able to plan, schedule, and carry out projects assigned to them.
4. be able to work together on an interdisciplinary team such as found in the aerospace culture.

Academic Programs at the Prescott Campus

IV. Discipline Specific Depth

Alumni working in the engineering field will demonstrate depth in their discipline and exposure in related areas. They will

1. have developed depth in communications theory, control theory, power electronics, or analog/digital circuits.
2. show an aptitude for independent work while accomplishing the tasks they are assigned.
3. demonstrate an ability to develop a deeper understanding of a particular area of EE or to learn about a new area.
4. be able to use software tools appropriate to their jobs, including Matlab, VHDL, Orcad, etc.
5. be capable of immediate productivity upon graduation.

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; Telephone: (400) 347-7700.

Degree Requirements

The Bachelor of Science in Electrical Engineering requires the successful completion of a minimum of 127 credit hours. The Electrical Engineering degree includes a space option in which EP 394, AE 427, and AE 495 substitute for the ES elective, EE 420, and EE 421.

FRESHMAN YEAR

Course		Title	Credits
CEC	220	Digital Circuit Design	3
CEC	222	Digital Circuit Laboratory	1
COM	122	English Composition and Literature	3
EGR	101	Introduction to Engineering	2
EGR	115	Introduction to Computing for Engineers	3
HU/SS		Lower-Level Humanities -OR- Social Sciences*	3
HU	14X	Lower-Level Humanities*	3
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
PS	150	Physics I for Engineers	3
PS	160	Physics II for Engineers	3
UNIV	101	College Success	(1)+
Total Credits			**32**

* In excess of degree requirements.

SOPHOMORE YEAR

Course		Title	Credits
CEC	320	Microprocessor Systems	3
CEC	322	Microprocessor Systems Laboratory	1
COM	221	Technical Report Writing	3
CS	225	Computer Science II	4
EE	200	Engineering Software Tools	1
EE	223	Linear Circuit Analysis	3
EE	224	Electrical Engineering Laboratory I	1
ES	312	Energy Transfer Fundamentals	3
MA	243	Calculus and Analytic Geometry III	4
MA	345	Differential Equations and Matrix Methods	4
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
Total Credits			**31**

JUNIOR YEAR

Course		Title	Credits
COM	219	Speech	3
EE	300	Linear Circuits Analysis II	3
EE	302	Electronic Devices and Circuits	3
EE	303	Signals and Filters	3
EE	304	Electronic Circuits Laboratory	1
EE	340	Electric and Magnetic Fields	3
EE	406	Digital Signal Processing	3
EE	407	Digital Signal Processing Laboratory	1
ES	407	Core Selection	3
MA		Math Elective (above MA 300-level)	3
MA	441	Advanced Engineering Mathematics I	3
		Specified Elective++	3
Total Credits			**32**

SENIOR YEAR

Course		Title	Credits
EC	2XX	Economics	3
EE		Advanced Elective**	6/7
EE	401	Control Systems Analysis and Design	3
EE	402	Control Systems Laboratory	1
EE	406	Digital Signal Processing	3
EE	407	Digital Signal Processing Laboratory	1
EE	410	Communication Systems	3
EE	412	Communication Systems Laboratory	1
EE	420	Avionics Preliminary Design	3
EE	421	Avionics Detail Design	3
ES	207	Fundamentals of Mechanics	3
HU		Lower-Level Elective	3
HU	330	Values and Ethics	3
Total Credits			**31/32**
TOTAL DEGREE CREDITS			**127/128**

* Embry-Riddle courses in the general education categories of Humanities and Social Sciences may be chosen as directed below, assuming prerequisite requirements are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified above in the Electrical Engineering vertical outline.

Humanities

LOWER-LEVEL:
Any HU course under 300 level.
UPPER-LEVEL:
Any course equal to or above 300 level.

Social Sciences

LOWER-LEVEL:
Any SS course under 300 level or PSY 220.
UPPER-LEVEL:
Any SS or EC course equal to or above 300 level, and HF 300 or PSY 350.

STG and RS courses may be substituted for Humanities and Social Sciences courses at the appropriate level.

** Advanced EE electives are selected from a list provided by the department chair.

Core ES selection is selected from ES 206, 299, 306, 307, 399, 409, 413, 499, or AE 412 or EP 394.

++ Specified elective is any AE, AF, CE, CS, EE, ES, MA, MY, PS course above 300 level, or as approved by department chair and not otherwise taken for the EE degree.

Minor Courses of Study

Minor courses of study are academic programs designed to satisfy students' personal interests and to meet their professional needs. Students explore, in some depth, the offerings in a field of study. A minor course of study provides the student with significant experience in a discipline organized around skills, methodology, and subject matter.

A minor program does not provide the depth of knowledge and experience as a major. All minors consist of 15-24 hours of coherent academic coursework. At least 6 hours must be fulfilled at the upper level. In addition, at least 6 hours of coursework applied to a minor must be completed at Embry-Riddle and at least 3 of those hours completed in residence must be at the upper-level. Students must earn a 2.00 GPA or higher in the minor to complete that program of study successfully.

To gain the greatest value from their academic experiences, students are encouraged to select minors that complement their degree program and/or other minors they are pursuing. They are also encouraged to declare a minor by the beginning of their senior year. Designed to include a minimum number of required courses, minors provide students, whenever possible, with flexibility in fulfilling program requirements. No more than two substitutions (6 hours) are permitted in any one minor or in any combination of multiple minors. A student who seeks three minors could have two substitutions in one minor, or one substitution in two of the three minors.

In addition to specific minors described in this catalog, students at the Prescott campus may earn an interdisciplinary minor or a minor in one of the listed disciplines by meeting the following requirements:

1. Complete a Declaration of Minor form and submit to the Office of Records and Registration
2. Complete 15 or more credit hours in related courses (at least 6 of these must be completed in residence)
3. Complete at least 6 hours of upper-division credit (at least 3 of these must be completed in residence)
4. Complete at least 6 credit hours in the discipline from courses that are not specifically required in the student's degree program
5. Earn at least a 2.00 GPA in the minor

Not all minors are offered at all Embry-Riddle locations.

Minor Courses of Study

The University offers the following minors at the Daytona Beach campus (D) and the Prescott campus (P).

Aeronautical Studies - D, P
Aerospace Electronics - D
Air Traffic Control - D, P
Asian Studies - P
Astronomy - D
Aviation Maintenance Science - D
Aviation Safety - D, P
Aviation Weather - D, P
Business Administration - D, P
Communication - D
Computer Applications - P
Computer Science - D, P
Computer-Integrated Manufacturing - D
Environmental Studies - D, P
Flight - D, P
Flight Test and Simulation - D
Helicopter Flight - D, P
Homeland Security - D
Human Factors - D
Humanities - D, P
Industrial Safety - D
Information Technology - D
International Relations - D
Mathematics - D, P
Psychology - D, P
Secondary Education - D
Security Studies - P
Space Studies - D, P
Technology, Policy, and Management - P

Minor Courses of Study

Minor in Aeronautical Studies

This minor will allow students in non-Aeronautical Science degree programs an increased exposure to advanced aviation knowledge by taking a sequence of 18 hours of mostly upper-level Aeronautical Science courses and acquire credit for a minor. No more than nine of the 18 hours required for this minor can come from courses required for the student's degree. A minor in Aeronautical Studies can be earned by successfully completing six of the following:

Course	Title	Credits
AS 254	Aviation Legislation	3
AS 309	Aerodynamics	3
AS 310	Aircraft Performance	3
AS 311	Aircraft Engines - Turbine	3
AS 356	Aircraft Systems and Components	3
AS 357	Flight Physiology	3
AS 350	Domestic and International Navigation	3
AS 402	Airline Operations	3
AS 405	Aviation Law	3
AS 408	Flight Safety	3
AS 410	Airline Dispatch Operations	3
AS 411	Jet Transport Systems	3
AS 420	Flight Technique Analysis	3
Total Credits Required		**18**

Minor in Aerospace Electronics

The minor in Aerospace Electronics provides a knowledge of digital electronics and its application to aviation and space electronics systems. The minor is not open to students enrolled in the Bachelor of Science degree in Aerospace Electronics or the Aerospace Electronics Area of Concentration in the Bachelor of Science degree in Aviation Maintenance Science. A minor in Aerospace Electronics can be earned by successfully completing the following:

Course	Title	Credits
AS 358	Advanced Avionics	3
EL 107	Direct and Alternating Current Fundamentals and Circuit Analysis	4
EL 108	Direct and Alternating Current Laboratory	1
EL 212	Digital Circuit and Systems Analysis	4
EL 213	Digital Circuit Laboratory	1
EL 307	Microprocessor Systems	3
EL 308	Microprocessor Systems Laboratory	1
Total Credits Required		**17**

Minor Courses of Study

Minor in Air Traffic Control*

The Air Traffic Control (ATC) minor provides the fundamental traffic controller knowledge and technical competency through a mix of classroom instruction, computer-based instruction, and realistic ATC laboratory simulations.

Embry-Riddle has a formal partnership agreement with the FAA that designates the University as an FAA-approved air traffic control training school. This partnership ensures that the learning objectives and the standards of student achievement are relevant to the needs of the FAA.

To qualify for the ATC minor, students must successfully complete the required prerequisites, listed below, and the four ATC courses.

Course		Title	Credits
AT	300	Air Traffic Management I	3
AT	305	Air Traffic Management III	3
AT	401	Air Traffic Management IV	3
AT	405	Air Traffic Management V	3
WX	201	Meteorology I	3
One of the following is required:			
AS	120	Principles of Aeronautical Science	3
		-OR-	
AS	132	Basic Aeronautics I	3
		FAA Private Pilot Certificate	1
Total Credits Required			**16-18**

* Students who are enrolled in the Air Traffic minor at the Prescott campus will have to take the ATC courses that have a laboratory at the Daytona Beach campus. This normally can be accomplished during the summer terms.

Minor in Asian Studies

The Asian Studies minor introduces a student to the cultures, histories, and languages of Asian countries, as well as cross-cultural comparisons between the United States and Asia. Any student can earn the minor by successfully completing at least 15 related credit hours, including six upper-level credits in Asian Studies earned at Embry-Riddle. These 15 credits can be earned from the following options:

Option I: Choose courses from the list of Asian Studies courses.

Option 2: Transfer up to nine credits in an Asian language or from Asian Studies courses or study abroad, and earn at least six upper-level Asian Studies credits from Embry-Riddle.

Course		Title	Credits
HU	160	Mandarin Chinese I	3
HU	161	Mandarin Chinese II	3
HU	270	Mandarin Chinese III	3
HU	271	Mandarin Chinese IV	3
RS	200	Modern Asia	3
RS	300	Observing Asian Cultures	3
RS	305	Asian Literature -OR-	
HU	399	Special Topics in Humanities: Directed Studies in Asia	3
Total Credits Required			**15**

Minor in Astronomy

Students may earn a minor in Astronomy by successfully completing one of the following two options:

Option 1:

Course		Title	Credits
PS	215	Physics I	3
PS	216	Physics I Laboratory	1
PS	208	Physics II	3
PS	219	Physics III	3
PS	220	Physics III Laboratory	1
PS	301	Astronomy	3
PS	303	Modern Physics	3
PS	305	Modern Physics Laboratory	1
EP	425	Observational Astronomy	3
PS	401	Astrophysics	3
		-OR-	
EP	420	Planetary Science	3
Total Credits Required			**24**

Option 2:

Course		Title	Credits
PS	150	Physics I for Engineers	3
PS	160	Physics II for Engineers	3
PS	250	Physics III for Engineers	3
PS	253	Physics Laboratory for Engineers	1
PS	301	Astronomy	3
PS	303	Modern Physics	3

PS	305	Modern Physics Laboratory	1
EP	425	Observational Astronomy	3
PS	401	Astrophysics -OR-	3
EP	420	Planetary Science	3
Total Credits Required			**23**

Minor in Aviation Maintenance Science

The minor in Aviation Maintenance Science leads to the student becoming a Federal Aviation Administration certified Airframe and Powerplant technician. The A&P certification is required to successfully complete this minor. This technical certification is a valuable addition to many of the other degrees offered on the Daytona Beach campus. Twenty-four credit hours of coursework from the Aviation Maintenance Science Department count toward the minor, but up to an additional 24 credit hours of AMS courses will be needed for A&P certification. A minimum of six credit hours, up to a maximum of 12 credit hours, will be upper-division (300-level) credit. Check the catalog information on the bachelor degree in Aviation Maintenance Science for the full listing of courses.

Credits awarded for the AMS minor: 24

Minor in Aviation Safety

This minor has a strong focus on aircraft accident investigation. Alternatively, students may also take courses that emphasize aviation safety management.

Course		Title	Credits
SF	201	Introduction to Health, Occupational, and Transportation Safety -OR-	
SF	210	Introduction to Aerospace Safety	3
SF	320	Human Factors in Aviation Safety	3

Nine additional credit hours must be completed from the following:

Course		Title	Credits
SF	330	Aircraft Accident Investigation	3
SF	335	Mechanical and Structural Factors in Aviation Safety	3
SF	345	Safety Program Management	3
SF	350	Aircraft Crash and Emergency Management	3
SF	375	Propulsion Plant Investigation	3
SF	435	Aircraft Crash Survival Analysis and Design	3
SF	445	System Safety in Aviation	3
SF	399/499	Special Topics in Aviation Safety	3
Total Credits Required			**15**

NOTE: Students in the Aeronautical Science degree program pursuing the Safety minor who complete SF 210/320 and one other upper-level SF course will not be required to take AS 408. Students taking AS 408 are not required to take SF 210. Students selecting this option must still meet the minimum number of hours required for degree completion in their declared area of concentration.

Minor in Aviation Weather

The minor in Aviation Weather introduces the student with an interest in weather to the intriguing world of meteorology. Developed primarily for aviation students, the minor can be used to delve deeper into the dynamics of the atmosphere by completing nine hours of WX courses beyond the two required courses. The minor requires 15 hours of weather (WX) courses (always check for prerequisites). The minor is not appropriate for students who major in Applied Meteorology and must include at least six hours of upper-level credits.

Course		Title	Credits
WX	201	Meteorology I	3
WX	352	Meteorology II	3

Recommended Electives for flight students:

WX	261	Applied Climatology	3
WX	363	Thunderstorms	3
WX	364	Weather for Aircrews	3
WX	365	Satellite and Radar Weather Interpretation	3
		Or any combination of WX courses	9
Total Credits Required			**15**

Minor Courses of Study

Minor in Business Administration

Students may earn a minor in Business Administration by successfully completing the following. This minor is not open to students pursuing degrees offered by the College of Business.

Course	Title	Credits
BA 201	Principles of Management	3
EC 200	An Economic Survey -OR-	
EC 210	Microeconomics	3
BA 210	Financial Accounting	3
BA 311	Marketing	3
	Specified Electives*	6

* Specified Electives

BA 322	Aviation Insurance	3
BA 324	Aviation Labor Relations	3
BA 405	General Aviation Marketing	3
BA 406	Strategic Management of Technical Operations	3
BA 408	Airport Management	3
BA 410	Management of Air Cargo	3
BA 412	Airport Planning and Design Standards	3
BA 415	Airline Management	3
BA 419	Aviation Maintenance Management	3
BA 422	Life-Cycle Analysis for Systems and Programs in Aviation/Aerospace	3
BA 426	International Aviation Management	3
BA 450	Airline/Airport Marketing	3
EC 420	Economics of Air Transportation	3
Total Credits Required		**18**

Minor in Communication

The minor in Communication is designed to encourage an appreciation of communication as the basis of shared meaning, to provide interpersonal competencies that will benefit students in any workplace, and to provide the advanced coursework in communication that high-skill, high-wage jobs require or encourage.

Students may earn a minor in Communication by successfully completing 18 credit hours from the following:

Course	Title	Credits
COM 219	Speech	3
COM 221	Technical Report Writing -OR-	
COM 222	Business Communication	3
COM 260	Introduction to Media	3
COM 265	Introduction to News Writing	3
COM 351	Journalism	3
COM 360	Media Relations I	3
COM 364	Layout and Design	3
COM 410	Advanced Professional Writing	3
COM 411	Publishing on the Internet	3
COM 412	Seminar in Writing for Specific Audiences	3
COM 460	Media Relations II	3
HU 355	Creative Writing	3
HU 361	Interpersonal Communication in the Work Group	3
HU 362	Communication and Organizational Culture	3
HU 363	Communication and Society	3
HU 370	Advanced English Grammar	3
HU 375	The Nature of Language	3
HU 420	Applied Cross Cultural Communication	3
CEAR 396	Co-op EDA/SP Studies (Only 3 hours of earned credit apply toward minor. Co-op must be approved by program chair to count for the minor.)	3
Total Credits Required		**18**

Minor in Computer Applications

The minor in Computer Applications is designed to provide utilitarian knowledge of desktop computers and local area networks (LAN). Students completing this minor will be able to function as computer specialists in their domain of expertise. The minor is open to all majors and requires 18 credit hours of computer courses. Prerequisite knowledge to start this program is at the level of IT 109. The goal of the minor in Computer Applications is to provide students with a working knowledge of computer applications, local area networks, Windows based systems, analysis of end-user requirements, and computer hardware.

Course	Title	Credits
CS 117	Computer Configurations	3
CS 118	Fundamentals of Computer Programming	3
CS 207	Network-Based Computing	3
CS 308	Practicum	3

IT	210	Web Page Authoring and Design	3
		Specified Electives*	3

* Specified Electives are chosen from the following list:

CS	111	Spreadsheet	1
CS	114	Presentation Graphics	1
CS	116	Recent Trends in Application Software	1
Total Credits Required			**18**

Minor in Computer-Integrated Manufacturing

Students may earn a minor in Computer-Integrated Manufacturing by successfully completing the following:

Course		Title	Credits
CS	335	Introduction to Computer Graphics	3
CS	344	C Programming and UNIX -OR- equivalent C programming course	3
MFE	330	Introduction to CAD/CAM	3
MFE	492	Robotics and Computer-Aided Manufacturing	3
MFE	493	Concurrent Engineering	3
Total Credits Required			**15**

Minor in Computer Science

Students may earn a minor in Computer Science by successfully completing the following:

Course		Title	Credits
EGR	115	Introduction to Computing for Engineers	3
CS	225	Computer Science II	4
SE	300	Software Engineering Practices	4
XX	300-400*	CS/SE/CEC electives	6
Total Credits Required			**17**

*XX 300-400. In addition to any 300-400 level CS/SE/CEC electives, students may take ES 405 or any computer-related course approved by the Computer and Software Engineering Department.

Minor in Environmental Studies

This course sequence is an interdisciplinary program designed to provide a fundamental knowledge of the natural environment and the dimensions of human impacts. It provides in-depth analysis of the relationship between the environment, culture, and law. Furthermore, it supplies knowledge about major environmental issues surrounding technology and technical careers. Not open to STG-Environment students.

Course		Title	Credits
PS	107	Elements of Biological Science	3
PS	101	Basic Chemistry -OR-	
PS	105	General Chemistry I -OR-	
PS	108	Contemporary Chemistry -OR-	
PS	140	Chemistry for Engineers	3/4
PS	142	Introduction to Environmental Science	3
PS	304	Environmental Science -OR-	
PS	309	Principles of Ecology	3
SS	360	Environmental Law -OR-	
STG	401	Environment and Culture	3
Total Credits Required			**15-16**

Minor in Flight

The Flight minor incorporates the courses required to obtain the FAA commercial pilot certificate with instrument and multi-engine ratings. In addition to the required flight courses, rigorous academic classes are included to provide professional pilot education in excess of the minimum FAA requirements for the associated FAA certificates. Included is instruction in CRM, team building, resource management, communication skills, and other topics associated with piloting multi-engine aircraft at the commercial level.

Course		Title	Credits
AS	132	Basic Aeronautics I	3
AS	133	Basic Aeronautics II	3
AS	232	Intermediate Aeronautics	3
AS	272	Advanced Aeronautics	2
FA	132	Commercial Pilot Flight I	1
FA	133	Commercial Pilot Flight II	1
FA	232	Commercial Pilot Flight III	1
FA	272	Commercial Pilot Flight IV	1
		Upper-Level AS Course	3
Total Credits Required			**18**

Minor Courses of Study

See the Advance Standing section in the University Academic Regulations and Procedures and the Aeronautical Science Notes under the Aeronautical Science degree sections of this catalog for information pertaining to these courses and the awarding of credit for previously earned FAA certificates.

Minor in Flight Test and Simulation

The minor in Flight Test and Simulation is an interdisciplinary minor that draws on many different majors fields of study with the commonality of aviation as a focal point. This minor has been designed to be available to almost all University majors by the section of the proper coursework. Typical major fields of study include but are not limited to Aerospace Engineering, Aeronautical Science, Human Factors, and Engineering Physics. Students may earn a minor in Flight Test and Simulation by completing 15 credits.

Course		Title	Credits
SIM	200	Aviation Simulation Systems	3
SIM	300	Flight Dynamics Algorithms	3
		-OR-	
AS	340	Instructional Design in Aviation	3
SIM	410	Flight Test and Simulation	3
Two of the following courses are required:			
SIM	400	Instrumentation for Flight Test	3
SIM	402	Introduction to Flight Testing	3
SIM	406	Aviation Simulation Systems Integration	3
SIM	404	Fly-by-Wire Aircraft Simulation and Design	3
Total Credits Required			**15**

Minor in Helicopter Flight

This minor incorporates courses required to obtain the FAA private and commercial pilot certificates and either the helicopter instrument rating or helicopter flight instructor certificate. Rigorous academic classes are included to provide professional pilot education. Included is instruction in resource management, high-altitude helicopter operations, and other topics associated with piloting helicopters at the commercial level. The flight portion of the minor is taught by an FAA-approved 141 flight school. Advanced standing credit is awarded when the student completes each certificate/rating.

Course		Title	Credits
AS	142	Private Helicopter Operations	3
AS	242	Commercial Helicopter Operations	3
AS	342	Instrument Helicopter Operations	3
		-OR-	
AS	442	Flight Instructor Helicopter Operations	
Any upper-level (300/400) AS, SF, or WX course			3
Advanced standing for:			
		Helicopter Private Pilot Certificate	1
		Helicopter Commercial Pilot Certificate	1
		Helicopter Instrument Rating	1
		-OR-	
		Helicopter Flight Instructor Certificate	
Total Credits Required			**15**

Minor in Homeland Security

This minor has a strong focus on protecting the nation's transportation infrastructure and planning for, responding to, and emergency management of events dealing with acts of terrorism and natural and man-made disasters. This minor complements degrees in safety, aeronautical science, airport management, communication, human factors, aeronautics, business, or aerospace studies. This minor requires 18 credit hours of the following courses:

Course		Tiltle	Credits
HS	201	Introduction to Homeland Security	3
HS	301	Fundamentals of Transportation Security	3
HS	302	Fundamentals of Occupational Security	3
HS	306	Legal and Investigative Issues of Security	3
HS	401	Emergency Planning, Response, and Security Management	3
HS	402	Security and Risk Analysis	3
Total Credits:			**18**

Minor in Human Factors

Students may earn a minor in Human Factors by successfully completing the two specified courses and an additional three courses from the list following, totaling 15 credit hours.

Specified Courses:

Course		Title	Credits
HF	300	Human Factors I: Principles and Fundamentals	3
PSY	220	Introduction to Psychology	3

Nine additional credit hours must be completed from the following list:

Course		Title	Credits
HF	302	Human Factors II: Analytic Methods and Techniques	3
HF	305	Human Factors III: Ergonomics and Bioengineering	3
HF	310	Human-Computer Interaction	3
HF	315	Automation and Systems Issues in Aviation	3
HF	320	Processes Underlying Cockpit Resource Management	3
HF	325	Human Factors and System Safety	3
HF	330	Human Factors in Space	3
HF	335	Human Factors in Air Traffic Control	3
HF	340	Human Factors in Product Liability	3
HF	345	Human Factors Issues in Lifespan Development	3
HF	400	Human Factors IV: System Design	3
HF	405	System Performance Modeling	3
HF	410	Human Factors Engineering: Crew Station Design	3
HF	415	Human Factors in Simulation Systems	3
HF	420	Advanced Topics in Human-Computer Interaction	3
HF	425	Human Factors in Computer Systems Design	3
HF	430	Tests and Measurements	3
SF	320	Human Factors in Aviation Safety	3
Total Credits Required			**15**

Minor In Humanities

Students may earn a minor in Humanities by successfully completing 18 hours by selecting two courses from the HU 140-146 series for a subtotal of 6 credits.

Additionally, students must complete one or more courses from each of the following lists for a subtotal of 12 credits:

Course		Title	Credits
NARRATIVE			
HU	300	World Literature	3
HU	305	Modern Literature	3
HU	310	American Literature	3
HU	325	Exploring Film	3
SPECULATIVE			
HU	330	Values and Ethics	3
HU	335	Technology and Modern Civilization	3
HU	341	World Philosophy	3
RELIGION AND FINE ARTS			
HU	320	Aesthetics of Visual and Musical Arts	3
HU	345	Comparative Religions	3
HU	355	Creative Writing	3
Total Credits Required			**18**

HU 399/HU 499, Special Topics in Humanities, may be included with advance permission of the department chair.

Minor in Industrial Safety

This minor exposes students to the broader field of safety. While focusing on managing safety under OSHA and EPA regulations that all business (aviation and nonaviation) in the United States must adhere to, this minor also covers safety programs required by the FAA.

Required Courses

Course		Title	Credits
SF	201	Introduction to Health, Occupational and Transportation Safety	3
SF	355	Industrial Hygiene and Toxicology	3
SF	410	Design of Engineering Hazard Controls	3
AND any two of the following:			
SF	315	Environmental Compliance and Safety	3
SF	330	Aircraft Accident Investigation	3
SF	345	Safety Program Management	3
SF	365	Fire Protection	3
SF	399/499	Special Topics in Aviation Safety	3
Total Credits Required			**15**

NOTE: SF 345 and SF 330 can be used for either the Aviation Safety minor or the Industrial Safety minor, but not both.

Minor Courses of Study

Minor in Information Technology

The Information Technology minor includes a core that provides basic knowledge and understanding of computer programming, the World Wide Web, and computer networks. The core provides the foundation for a student to pursue one of two tracks: the Webmaster track or the Network Administration track. The Webmaster track prepares a student to work in the development and administration of an Internet Web site. The Network Administration track prepares a student to work as a system administrator of a computer network.

Core

Course		Title	Credits
CS	118	Fundamentals of Computer Programming (or other programming courses such as CS 223 or CS 125)	3
IT	210	Web Page Authoring and Design	3
IT	220	Introduction to Networking	3

Elective (one course from the following):

BA	320	Business Information Systems -OR-	
COM	411	Publishing on the Internet -OR-	
CS/CEC		Approved CS/CEC elective -OR-	
HF	310	Human-Computer Interaction	3
Total Credits			**12**

Track 1: Information Technology - Webmaster

IT	310	Web Site Management	3
IT	330	Programming for the Web	3
Total Credits			**6**

Track 2: Information Technology - Network Administration

IT	320	Network Configurations	3
IT	340	WAN Theory and Design	3
Total Credits			**6**

Total Credits Required **18**

Minor in International Relations

Students may earn a minor in International Relations by successfully completing the following:

Course		Title	Credits
SS	331	Current Issues in America	3

One of the following is required:

EC	200	An Economic Survey	3
EC	211	Macroeconomics	3
SS	110	World History	3
SS	120	American History	3
SS	130	History of Aviation in America	3
SS	204	Introduction to Geography	3

Three of the following are required:

BA	335	International Business	3
SS	305	American Military History	3
SS	325	International Studies	3
SS	326	Russian-American Relations	3
SS	333	US-Asian Relations	3
SS	340	American Foreign Policy	3
SS	363	Inter-American Relations	3
Total Credits Required			**15**

Minor in Mathematics

Students may earn a minor in Mathematics by completing the following:

Course		Title	Credits
MA	241	Calculus and Analytic Geometry I	4
MA	242	Calculus and Analytic Geometry II	4
MA	243	Calculus and Analytic Geometry III	4
MA	245	Applied Differential Equations -OR-	3
MA	345	Differential Equations and Matrix Methods	4
MA		Electives (approved by department chair)	5-6
Total Credits Required			**21**

Minor in Psychology

Students may earn a minor in Psychology by completing the following:

Required Courses

Course		Title	Credits
PSY	220	Introduction to Psychology	3
PSY	350	Social Psychology	3
HF	300	Human Factors I: Principles and Foundations	3
Total Credits			**9**

Two of the following courses are also required:

BA	317	Organizational Behavior	3
HU	361	Interpersonal Communication in	

		the Work Group	3
HU	363	Communication and Society	3
PSY	310	Sensation and Perception	3
PSY	315	Cognitive Psychology	3
PSY	320	Aviation Psychology	3
PSY	325	Group Structure and Process	3
PSY	330	Learning and Motivation	3
PSY	340	Industrial-Organizational Psychology	3
PSY	345	Training and Development	3
PSY	365	Abnormal Psychology	3
PSY	400	Introduction to Cognitive Science	3
SS	310	Personality Development	3
SS	350	Psychology of Relationships	3
STG	310	Evolution, Revolution, and Change	3
Total Credits Required			**15**

Three credits of HF 299, 399, or HF 499, or PSY 299, 399, or 499 (Special Topics in Psychology) may be substituted with advance permission of the department chair.

Minor in Secondary Education

Students may earn a minor in Secondary Education through a collaborative agreement between Embry-Riddle and the University of Central Florida (UCF) by completing the following courses at UCF:

UCF Courses	**Credits**
General Methods (Two courses)	6
EDF 2005 Introduction to Education	
EDF 4603 Analysis of Critical Issues in Education	
Sociological Foundations (Two courses)	6
EDG 2701 Teaching Diverse Populations	
EDG 4323 Professional Teaching Practices	
Psychological Foundations	3
EDF 4214 Classroom Learning Principles	
Special Methods (Select one)	**3-4**
EME 2040 Technology for Educators	
MAE 4360 Mathematics Instructional Analysis	
PET 4710 Teaching Physical Education K-12	
SCE 4360 Science Instructional Analysis	
Total Credits Required	**18-19**

In conjunction with the minor in Secondary Education, students seeking to acquire teacher certification at the secondary level have the opportunity to satisfy both education and internship requirements (18 additional credit hours) through collaborative agreements with UCF.

Minor in Security Studies

This course sequence has the goal of enhancing students' knowledge and employability by providing them with an understanding of basic principles of and issues in the process of policy-making; in-depth analysis of the relationships between security and globalization; and advanced knowledge of intelligence and criminal justice systems around the globe.

Not open to Global Security and Intelligence Studies students.

Course		**Title**	**Credits**
SS	325	International Studies	3
SIS	317	Political Change, Revolution, and War	3
SS	340	American Foreign Policy	3
Two courses selected from the following list:			
SIS	312	Global Crime and International Justice System	3
SIS	315	Studies in Global Intelligence I	3
SIS	400	International Security and Globalization	3
Total Credits Required			**15**

Minor In Space Studies

Students may earn a minor in Space Studies by completing 15 credits from the following list.

Twelve credits selected from:

Course		**Title**	**Credits**
SP	110	Introduction to Space Flight	3
SP	200	Planetary and Space Exploration	3
SP	210	Space Transportation System	3
SP	215	Space Station Systems and Operations	3
SP	220	Life Support Systems	3
SP	300	Satellite and Spacecraft Systems	3
SP	400	Introduction to Space Navigation	3
SP	299/399/499	Spec. Topics in Space Studies	3
In addition, all students must complete:			
SP	425	Selected Topics in Space and Aerospace	3
Total Credits Required			**15**

Minor in Technology Policy and Management (TPM) studies

This course sequence has the goal of enhancing students' knowledge and employability by providing them with an understanding of basic principles of management; in-depth analysis of the relationships between technology, politics, culture, labor, and business; and advanced knowledge of organizational management and international business. Not open to STG-TPM students.

Course		Title	Credits
BA	201	Principles of Management	3
STG	305	Global Policy Studies	3
STG	325	Engineering Cultures	3
Two courses selected from the following list:			
BA	308	Public Administration	
BA	311	Marketing	
BA	314	Human Resource Management	
BA	317	Organizational Behavior	
BA	335	International Business	
Total Credits Required			**15**

Special Academic Programs and Opportunities

Embry-Riddle Language Institute (ERLI)

The Embry-Riddle Language Institute (ERLI) was established to help non-English speaking prospective students and aviation professionals become more proficient in listening, speaking, reading, and writing skills.

This program is offered to those who have a TOEFL level of less than 550 or other demonstrated English-language deficiencies. The purpose of the program is to prepare students for whom English is not the first language to move into Embry-Riddle degree programs or other academic institutions. Specific aviation courses have been developed for aircraft maintenance, avionics, aviation management, air traffic control, and flight. More information is available by contacting the ERLI Office at (386) 226-6192.

Study Abroad

Embry-Riddle offers students in all programs, but especially in the engineering and computer science disciplines, the chance to study abroad for a year at minimal cost. Qualified students from both residential campuses receive language and cultural training and enroll at partner institutions in Europe, Central and South America, Asia, or Australia. While abroad, students study subjects applicable to their degree programs at the University. During the last six months of their year abroad, students may qualify to complete a paid internship in industry, working on technical problems related to their field of study. After successful completion of the French or German programs, students may receive the Euronational Certificate. A double-diploma program and graduate programs are also available through EPF in Paris and ENAC in Toulouse, France.

Embry-Riddle is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097 Telephone: 404-679-4501) to award associate, bachelors, and master degrees. International exchange partner institutions are not accredited by the Commission on Colleges and the accreditation of Embry-Riddle does not extend to or include the partner institutions or their students. Although Embry-Riddle accepts certain partner institution coursework in transfer, other colleges and universities may not accept this work in transfer, even if it appears on a transcript from Embry-Riddle. Each institution decides for itself whether it should accept transfer credit from another institution.

In the case of approved double diploma arrangements, Embry-Riddle must provide direct instruction for at least 25 percent of the coursework leading to an Embry-Riddle undergraduate degree, or at least 50 percent of the coursework leading to an Embry-Riddle graduate degree.

Four- and five-week Summer Term Abroad programs on three continents offer students from all degree programs opportunities for academic experiences at foreign universities, accompanied by Embry-Riddle professors.

Contracted ROTC students will have specific restrictions for travel to designated foreign countries and must advise cadre and obtain approval prior to applying for this program.

Special Academic Programs and Opportunities

Cooperative Education

Cooperative Education/Internship offers qualified students an opportunity to gain valuable experience, explore career options, develop contacts in the industry, and earn college credit. Requirements and benefits vary by degree program and by employer. Students should discuss their co-op/internship plans with their academic advisor, Career Services program manager, and, when applicable, with the co-op/internship faculty advisor in their degree program. One upper-level open elective credit hour is awarded for every 100 clock hours of work completed, up to a maximum of six credit hours in one semester. Additional information, including current openings and requirements, is available from the Career Services Office and on the Career Services Web site. A co-op/internship fee based on the cost of one credit hour in a student's degree program is charged each semester.

Reserve Officer Training Corps

Reserve Officer Training programs are subject to the control of the service branch that sponsors them and are operated according to the rules and regulations established by the service branch. These may be changed from time to time without notice or obligation.

Not all Reserve Officer Training programs are available at all University campuses or locations. Students should contact the Admissions Office to determine program availability.

Air Force Reserve Officer Training Corps

The Air Force Reserve Officer Training Corps (Air Force ROTC) is an educational program designed to give men and women the opportunity to become Air Force officers

while completing their college degrees. The Air Force ROTC program is focused on preparing cadets to become leaders in today's high-tech Air Force.

Air Force ROTC enrollment is not restricted to individuals who wish to become commissioned officers in the USAF. Students may elect to take Air Force ROTC courses for academic credit only, earning elective credits for all University degrees. Additionally, Prescott campus students who complete all 16 hours of Air Force ROTC coursework are eligible for a Defense Studies minor. For more information, refer to the Minor Courses section of the catalog.

Any qualified student may enroll in Air Force ROTC; check with your local Air Force ROTC detachment for more information.

Four-Year Program

The first half of the four-year program is called the General Military Course, which is offered during a student's freshman and sophomore years. This program allows students to try out Air Force ROTC for up to two years without incurring any obligation (unless they are on an Air Force ROTC scholarship). As students attend class, they learn more about the Air Force and the historical development of airpower. The last two years are called the Professional Officer Course. These junior and senior level classes cover leadership skills and national defense policy.

Two-Year Program

This program, also called the Professional Officer Course, or POC, is available to any student or veteran who has approximately two years of college work remaining (undergraduate, graduate, or a combination of the two). It's especially suited for those who major in selected scientific and technical areas such as mathematics, physics, engineering, and computer science. The POC program is highly competitive, so it's important to apply early in your sophomore year.

One-Year Program

The one-year program is available to students with approximately one year of college work remaining. The one-year program is open to all majors, both undergraduate and graduate. If selected, cadets attend a seven-week AFROTC field-training encampment during the summer before they enter AFROTC. After successfully completing all requirements, cadets are commissioned as Air Force officers.

Finances

Textbooks for all Air Force ROTC courses are free. Students who have contracted with Air Force ROTC receive a tax-free subsistence allowance during the academic year of $250-$400 per month, depending on their academic year.

Air Force ROTC Scholarships

Air Force ROTC offers scholarships covering a student's college education for two, three, or four years. Each scholarship pays up to full tuition, laboratory fees, incidental fees, an annual book allowance up to $600, and a tax-free subsistence allowance of at least $250 per month (see Finances). As an extra incentive to AFROTC scholarship students, Embry-Riddle provides an annual assurance of $7,000 per year, approximating the university's annual room and board cost. High school students interested in a scholarship should apply as soon as possible in the six-month application period (June 1 to December. 1 of their senior year). Application forms for the scholarship are available online at http://www.afrotc.com.

In-college scholarship opportunities are also available for students already enrolled in the Air Force ROTC program. Freshmen can earn three-year scholarships, while sophomores can earn two-year scholarships. College transferees may also apply for these scholarships.

All scholarship applicants must meet the following minimum requirements:

- Be a U.S. citizen
- Be less than 31 years old as of Dec. 31 of the year you will commission
- Meet military and physical standards
- Pass the Air Force Officer Qualifying Test
- Have a minimum cumulative GPA of 2.50

For more information, contact either:

AFROTC Detachment 157
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-6880
http://www.db.Embry-Riddle.edu/campus/departments/afrotc

-OR-

AFROTC Detachment 028
Embry-Riddle Aeronautical University
3700 Willow Creek Road
Prescott, AZ 86301-3720
(928) 777-3868
(800) 888-Embry-Riddle, ext. 3868
http://www.erau.edu/pr/rotc/afrotc/index.html

Army Reserve Officer Training Corps

Army Reserve Officer Training Corps (ROTC) is open to both men and women, freshmen through seniors, and may lead to a commission as an officer in the U.S. Army. Army ROTC enhances a student's education by providing unique leadership and management training, along with practical experiences. The curriculum is designed to be challenging, educational, and flexible enough to allow students to meet scholastic and personal goals. Classes and training include leadership development, leadership problem-solving, tactics, physical training, map reading, land navigation, rappelling, rifle marksmanship, patrolling, drill and ceremony, military history, ethics, and military law. Students may earn 18 hours of academic credit for completing four years of Army ROTC. The ROTC courses may also be applied toward open elective requirements in degree programs. All uniforms, military textbooks, and equipment are issued to Basic Military Science freshman/sophomore cadets at no charge.

Army Reserve Officer Training

The Army Reserve Officer Training Corps program gives students an opportunity to acquire the skills and knowledge necessary for commissioning as a second lieutenant in the U.S. Army. The program offers a two, three, and four-year option. The two-year option allows students with at least two academic years remaining in college to meet all requirements for commissioning by attending basic camp or using past military experience for credit.

Basic Military Science

The Basic Military Science courses are offered during the freshman and sophomore years. These courses cover military organization, equipment, weapons, map reading, land navigation, use of compass, rank structure, threat, communications, leadership, and physical training. Each course consists of classroom instruction and a mandatory lab. Students are required to have a doctor's statement allowing participation in college-level physical education classes. Freshman and sophomore students may enroll in Basic Military Science classes with no obligation to the Army.

Advanced Military Science

The Advanced Military Science courses are normally taken during the junior and senior years. These courses specialize in small unit tactics, preparation and conduct of military training, military justice system, staff procedures, decision making and leadership, managerial concepts, problem analysis, military writing, the ethics of the professional soldier, and physical training. The courses consist of classroom instruction and a mandatory lab. This phase requires attendance at a five-week National Leadership Development Assessment Course (LDAC) held at Ft. Lewis, Wash., during the summer after the junior year.

Leaders Training Course

A summer training program is offered for students without previous ROTC or military training who will be academic juniors. A five-week course at Fort Knox, Ky., during the summer after the sophomore year qualifies a student for entry into the Advanced Course, thus allowing completion of all requirements for commissioning in two years. Students attending the summer camp at Fort Knox receive approximately $800. Students receive four hours of credit for the basic military science course upon completion of the Leadership Training Course.

Benefits

All contracted military science students receive a monthly stipend of $300-$500 per month.

Four-year, three-year, and two-year scholarships are available to those who qualify. The higher the student's GPA and SAT/ACT scores, the better their chance of being selected as a scholarship recipient.

In addition, entering freshmen who receive three-year advance designee and four-year Army ROTC scholarships are eligible to receive additional financial incentives from Embry-Riddle. Army Green to Gold Scholarship winners may be eligible for these incentives as well.

All applicants must meet the following requirements:

Special Academic Programs and Opportunities

- Be a U.S. citizen
- Be under 31 years of age prior to commissioning
- Meet required medical and physical standards
- Have a minimum cumulative academic GPA of 2.50
- Have a minimum SAT score of 920 or an ACT composite score of 19

Scholarship benefits include

- Full tuition per year
- A subsistence allowance of $300-$500 per month
- A $450 book allowance per semester
- Embry-Riddle ROTC Scholarship Assurance - $7,000 per year minimum for certain Army ROTC scholarship winners

Admission to the Basic Course

Admission requirements are:

- Enrollment in a baccalaureate or master degree program
- Must be at least 17 years of age at time of entry
- U.S. citizen
- Must maintain full-time student status each term

Admission to the Advanced Course

Admission requirements are:

- Successful completion of the Basic Course Leader's Training Camp or its equivalent
- Successful completion of the Army physical examination
- Selection by the professor of Military Science
- Agreement to complete the Advanced Course requirements and serve on active duty, reserve, or National Guard duty as a commissioned officer
- Maintain a 2.00 overall academic GPA and a 3.00 ROTC GPA
- Must maintain full-time student status each term

Army Green to Gold

If you are currently on active duty and will have two years of active duty before school starts and are accepted by Embry-Riddle as either a freshman, sophomore, or junior, you can compete for an Active Duty Green to Gold four, three, or two-year scholarship.

You must have a GT score of 110 or higher and a cumulative grade point average of 2.50 on a 4.00 grading system to be eligible for the three or two-year scholarship. A GT score is not required for individuals applying for a four-year scholarship. Four-year applicants must have a cumulative grade point average of 2.00 on a 4.00 grading scale. All applicants must meet other eligibility requirements. An SAT score totaling 920 or an ACT composite score of 19 is required for three and four-year Green to Gold scholarships.

For further information contact:

Daytona Beach Campus

Embry-Riddle ARMY ROTC
600 S. Clyde Morris Blvd.
ROTC Building, Second Floor
Daytona Beach, FL 32114-3900
(386) 226-6470/6470/6437
fax: (386) 226-7615
email: armyrotc@erau.edu

Prescott Campus

Embry-Riddle ARMY ROTC
Bldg. 80
3700 Willow Creek Road
Prescott, AZ 86301-3720
(928) 777-3870
fax: (928) 777-3772
email: goldbar@erau.edu
http://www.flyarmyrotc.com/

Physical Training

All nonscholarship cadets are required to attend physical training one day per week as part of the course grade. All scholarship and Advanced Course cadets are required to attend physical training three days per week as part of the course grade. Physical training is normally conducted on Monday, Wednesday, and Friday from 6-7 a.m.

Marine Corps Programs

For freshmen, sophomores, and juniors, the Marine Corps offers the Platoon Leaders Course (PLC) program. Freshmen and sophomores attend two six-week training sessions and juniors attend one 10-week session at Quantico, Va. During the training sessions candidates can earn from $2,100 to $3,200, depending on which training session is attended. In addition, eligible candidates may apply for two financial assistance programs, the Financial Assistance Program (FAP) and the College Tuition Assistance Program (CTAP). Call or visit the Web site to receive more information.

To be eligible for the program, the student must be a U.S. citizen (either native-born or naturalized), with full-time enrollment in a minimum of 12 academic credits per semester, and must be working toward an accredited/recognized baccalaureate degree.

The PLC Program offers two entry-level paths that lead to commissioning as a second lieutenant in the U.S. Marine Corps. The first is the Guaranteed Aviation Program. Applicants must have a qualifying ACT, SAT, or ASVAB score and must take the Aviation Selection Test Battery (ASTB). Those who have at least the minimum score of 4/6 on the ASTB; pass a Class 1 aviation medical examination performed at a Navy medical facility; pass a Marine Corps Physical Fitness Test (PFT); and are accepted into the program by Headquarters Marine Corps, will be eligible to receive a contract guarantee. The second program is the Ground Officer Program. This program encompasses all military occupational specialties not directly related to piloting aircraft, or guaranteed law.

To be eligible for the U.S. Marine Corps Platoon Leaders Class Program, a student must be enrolled full-time. Openings are available for men and women with any major. Contact the Officer Selection Office at (866) 290-2680 (toll free) or (407) 249-5873.

Naval Aviation Club

A dynamic Naval Aviation Club informs and assists students who are eager to learn about naval aviation careers. Membership dues are nominal and no academic credit is conferred. The club features guest speakers and aircraft from fleet squadrons, in addition to field trips to naval air stations, aircraft carriers, and the cradle of naval aviation at Pensacola. Current Navy policy information is made available through close liaison with Navy Recruit Command representatives.

Special Academic Programs and Opportunities

The U.S. Navy offers a Bachelor Degree Completion Program with a Guaranteed pilot contract. This program is open to all Embry-Riddle students. If selected, the Navy will pay you $1,900 per month. This remuneration will be paid to you for the last three years of school, if you are working toward a technical degree, or for the last two years of school for a nontechnical degree. This program can provide you over $68,000. This is not ROTC. There are no drills, and uniforms are not required. You must maintain a 3.0 GPA (GPA waivers are possible). All majors are eligible. After graduation, you will proceed to the Naval Air Station Pensacola, Fla. for Aviation Officer Candidate School. After 14 weeks, you will be commissioned an ensign in the U.S. Navy and begin flight training. For more information, contact the president of the Embry-Riddle Naval Aviation Club.

Naval Reserve Officers Training Corps

The Naval Reserve Officers Training Corps (NROTC) unit administers the Naval Science Program at Embry-Riddle. This program affords selected men and women the opportunity to receive instruction in Navy specified courses which, in conjunction with the baccalaureate degree, will qualify them for a commission in the U.S. Navy or Marine Corps. Students enrolled in the University who are physically and mentally qualified are eligible to apply for the NROTC Program. As naval officers, Embry-Riddle NROTC graduates become eligible for varied careers, serving in aviation squadrons, on surface ships, on submarines, and in special operations, or in numerous sub-specialties as an officer of the Marine Corps. With the consent of the professor of naval science, any student, although not enrolled in the NROTC Program, is eligible for enrollment in naval science courses. Students interested in the Embry-Riddle NROTC Program may compete for four-year NROTC national scholarships prior to matriculation. Students who join the unit through the NROTC College Program are eligible to compete for other types of scholarships throughout their college career.

Naval ROTC Two and Four-Year National Scholarship Programs

The NROTC Scholarship Program is open to young men and women of all races, creeds, and national origin who are U.S. citizens. Students are selected on their own merit to become officers in the U.S. Navy and Marine Corps.

Scholarship students are appointed midshipmen, U.S. Navy Reserve. The Navy pays for tuition, fees, textbooks, uniforms, and a monthly subsistence allowance starting at $250 per month for first-year candidates up to $400 for fourth-year students during the academic year for four-year scholarship winners. Scholarship students are normally selected through national competition during their senior year in high school. However, students who are already enrolled in college but not in the NROTC Program may compete nationally for two-year scholarships. If selected, the student will attend the Naval Science Institute in Newport, R.I., for an intensive six-week training course of naval science and military training. Although it is not a requirement, a student in the NROTC Scholarship Program is encouraged to pursue a major in engineering, mathematics, chemistry, or physics to meet the technological requirements of the Navy. Other fields of study for a major leading to a baccalaureate degree are permitted, with the approval of the professor of naval science. Regardless of the major, every Navy scholarship student must complete one year of calculus and calculus-based physics.

Students must include certain Navy specified courses in their program and complete a program of courses as prescribed by the professor of naval science. Upon graduation and successful completion of the naval science curriculum, the midshipman will receive a reserve commission as ensign in the U.S. Naval Reserve or second lieutenant in the U.S. Marine Corps Reserve and will serve on active duty for a minimum of four years, with a total service obligation of eight years.

Navy-Marine Corps College Program

The NROTC College Program is designed to train and educate well-qualified young men and women for commissioning. Selected students are appointed as midshipmen in the Naval Reserve prior to commencement of the advanced course in the junior year. The Navy pays for uniforms and naval science textbooks during the four-year period and, during the junior and senior years, pays the midshipman a monthly subsistence allowance. Each student is selected for enrollment in the program through application to the Naval Education and Training Command on the basis of past academic performance, potential, personal interviews, and a physical examination. A college program midshipman only acquires a military service obligation after entering the advanced courses at the beginning of the junior year.

Although there are no restrictions on the major college program students may pursue, it is highly recommended that they pursue a course of study similar to that of scholarship students. Students must also include in their program certain Navy specified courses and a program of courses in naval science. Students, upon graduation and successful completion of the naval science curriculum, receive a Reserve commission as an ensign in the U.S. Naval Reserve or as a second lieutenant in the U.S. Marine Corps Reserve and incur a total service obligation of eight years, with at least three of those years served in active-duty status.

Naval ROTC Two-Year College Program (Nonscholarship)

NROTC offers a two-year nonscholarship program that is designed specifically for students commencing their third year of college who were not enrolled in the NROTC program during their freshman and sophomore years. Applications must be submitted during the sophomore year by March 1 to permit processing, personal interviews, and a physical examination. Qualifications for acceptance to this program include demonstrated ability to complete college-level science and math courses. Upon acceptance into this program, the student attends a six-week intensive course at the Naval Science Institute in Newport, R.I., in the summer prior to beginning the junior year

Special Academic Programs and Opportunities

of study. Students in a five-year engineering curriculum may attend the institution between their third and fourth years. The six-week summer course qualifies the student for enrollment in the NROTC Program at the junior level. During the student's attendance at the Naval Science Institute, the Navy provides room and board, books, uniforms, transportation from home and return, and also pays the student approximately $365 per month. Upon successful completion of the course, the Navy pays for uniforms and naval science textbooks provided, and a $350 subsistence allowance.

Naval ROTC Summer Training

The NROTC Scholarship Program student is required to complete training of approximately four weeks during each of the three summer recesses. During the first summer period, each scholarship student receives instruction in aviation training, marine combat training, surface warfare indoctrination, and submarine indoctrination either in Norfolk, Va., or San Diego, Calif. The second summer training is performed aboard operational ships of the U.S. fleet from an enlisted servicemember perspective. During the third summer, candidates for U.S. Navy commissions will perform training aboard operational ships as junior officers. The student who qualifies for nuclear propulsion training may elect to cruise on nuclear-powered ships or submarines. Some midshipmen cruise with allied navies through the Midshipman Foreign Exchange Program. Transportation costs to and from the training sites, subsistence, quarters, and pay of approximately $365 per month will be paid to every participating student. The candidates for U.S. Marine Corps commissions will perform training at the U.S. Marine Corps Base, Quantico, Va. The Marine Option NROTC Summer Training Program, called Bulldog, is designed to prepare midshipmen for appointment to commissioned grade by providing basic military instruction and physical training. An evaluation of midshipmen is made to ensure that they possess the leadership, academic, and physical qualifications required for appointment to commissioned grade in the Marine Corps Reserve. Female midshipmen participate in all NROTC curriculum requirements and activities, including cruises aboard selected ships. A woman who has qualified for Marine Option Summer Training at Quantico attends the Woman Officer Candidate Course at Officer Candidates School in Quantico, Va.

Graduate Programs

Those holding bachelor degrees who wish to pursue advanced study in aeronautical science, computer science, aerospace engineering, human factors and systems, or management of aviation and safety, may choose from nine degree program alternatives at the master level.

For more information on all graduate programs available and an application form, contact the following:

Graduate Admissions Office
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(386) 226-6115 - or - (800) 388-3728
fax: (386) 226-7111

email: graduate.admissions@erau.edu
http://www.embryriddle.edu

-OR-

Graduate Admissions Office
Embry-Riddle Aeronautical University
3700 Willow Creek Road
Prescott, AZ 86301-3720
(928) 777-6993 - or - (800) 888-3728
fax: (928) 777-6958
email: graduate.admissions@erau.edu
http://www.embryriddle.edu

Master of Science in Aeronautics

The Master of Science in Aeronautics (MSA) is designed to provide the aviation/aerospace professional with a rigorous academic approach to a generalist-oriented degree. It provides an opportunity for flight crew members, air traffic control personnel, flight operations specialists, industry management and technical representatives, and aviation educators to enhance their knowledge and pursue additional career opportunities.

Entry into the MSA program requires possession of an undergraduate foundation in college-level mathematics, introduction to computers, economics, behavioral science, and aviation legislation. Flight qualifications are not required for this degree.

There are seven specializations from which the student may choose: Aeronautics, Aviation/Aerospace Education, Aviation/Aerospace Management, Aviation/Aerospace Operations, Aviation/Aerospace Safety Systems, Space Studies, and Human Factors in Aviation Systems. Some specializations may not be offered in any given semester.

Master of Science in Aerospace Engineering/Master of Aerospace Engineering

The Master of Science in Aerospace Engineering (MSAE) and the Master of Aerospace Engineering (MAE) provide formal advanced study, preparing students for careers in the aerospace industry and research and development. Both degree programs are planned to augment the individual student's engineering and science background with adequate depth in aeroacoustics, nondestructive testing, aerodynamics, design and optimization, propulsion, aerospace structures, composite structures, computational fluid dynamics, or other areas of aerospace engineering. Candidates for both degrees can select courses with the goal of building a graduate program that supports their interests in the aerospace engineering profession, or that prepares them to continue on to doctoral studies.

Both degree programs require a minimum of 30 credit hours of graduate coursework.

These programs are available only at the Daytona Beach campus.

Master of Business Administration in Aviation

The Master of Business Administration in Aviation (MBA/A) program blends the development of management skills, tools, and techniques with the study of the aviation and aerospace industry. The MBA/A degree program is designed to develop aviation managers who can apply the concepts of modern management techniques to the challenges of the aviation industry. The MBA/A curriculum combines a strong traditional business core with specialization components in aerospace production and operations management, international management and aviation policy, airline operations and management, airport operations and management, aviation law and insurance, aviation labor relations, and aviation economics. The MBA/A on the Daytona Beach campus has special accreditation by the Association of Collegiate Business Schools and Programs (ACBSP).

The development of versatility and analytical resourcefulness are two of the key aims of the MBA/A program. The program is designed to emphasize pragmatic solutions to the managerial, technical, and operational problems likely to arise in the aviation industry because of the frequent and sweeping changes occurring in technology and regulations.

Master of Science in Human Factors and Systems

The Master of Science in Human Factors and Systems (MSHFS) degree program is designed to meet the highest academic standards , while also preparing students for immediate employability in real-world, cost-sensitive, and operationally driven aviation/aerospace environments. The degree program has two distinct tracks in Human Factors Engineering and in Systems Engineering. The Human Factors track is based on the scientist-practitioner model of the American Psychological Association (APA), adheres to guidelines established by the committee for Education and Training of APA's Division 21, and meets the accreditation requirements of the International Ergonomics Association.

The Human Factors track develops students' capacity to design, conduct, and apply human factors research in support of the design of simple and complex systems. The curriculum addresses the content and techniques of human factors, including statistical and quantitative procedures, experimental design, survey methods, computer techniques, and other research methodologies.

The Systems Engineering track provides a systemic focus to the transformation of an operational need into a defined system configuration through the iterative process of functional analysis, synthesis, optimization, and design integration. It addresses considerations of human factors, reliability, maintainability, logistic support, safety, producibility, economic, and related elements as they apply to system design, integration, and evaluation.

This program is available only on the Daytona Beach campus.

Master of Science in Safety Science

The Master of Science in Safety Science (MSSS) degree program is designed to provide the safety and aviation professional with an experiential and practical educational experience to enhance the practice of occupational health and safety. The degree will produce safety professionals who are skilled in providing safety management expertise and who can provide leadership and guidance in compliance issues involving EPA, OSHA, DOD, FAA, DOE, and state health, hygiene, and workplace standards. These safety professionals will be prepared for service in either the aviation/aerospace industry or other industries and organizations.

This program is available only on the Prescott campus.

Master of Software Engineering

The Master of Software Engineering (MSE) curriculum is designed with industry needs in mind. The goal of the curriculum is to produce a software engineer who can rapidly assume a position of substantial responsibility in a software development organization. The program emphasizes modern approaches to software development, with a special emphasis on software for real-time systems. The curriculum pays particular attention to the following:

- Software processes
- Software project management
- Software requirements engineering and design
- Communication and teamwork skills

This program is available to all graduates. Mathematics and computer science prerequisite knowledge is required for students with noncomputing degrees.

This program is available only at the Daytona Beach campus.

Master of Science in Space Science

The Master of Science in Space Science degree program provides graduate-level education and training in space science and space systems engineering, following the similar emphasis of the undergraduate Engineering Physics program. The goal is to provide graduates with the skills that will allow them to make an immediate contribution to space-related industries or to proceed to doctoral studies in a wide variety of disciplines.

The program specifically emphasizes scientific instrumentation, applied optics, remote sensing, spacecraft subsystems (power, attitude, and thermal control), and a wide variety of topics in space science and engineering.

This program is heavily research-oriented, with a majority of the faculty in the Department of Physical Sciences actively involved in scholarly activities in the space sciences and engineering. The research areas include experimental programs with satellite systems, sounding rockets, ground-based remote-sensing experiments, and a parallel program of theoretical studies in space systems engineering, upper atmospheric physics, space physics, plasma physics, and magnetospheric physics.

Aviation Maintenance Science

Airframe and Powerplant Technician Certification Program

The Airframe and Powerplant Technician Certification program provides the student with the training required to qualify for Federal Aviation Administration (FAA) Airframe and Powerplant Technician Certification. The 16-month program, offered only at the Daytona Beach campus, presents a carefully selected blend of theory and practical applications that qualifies the student to take the FAA certification examinations.

Students perform repairs and overhaul engines and accessories, including those used in the Embry-Riddle pilot-training fleet. The curriculum, facilities, equipment, and instructional staff are fully approved under the Code of Federal Regulations (CFR) Title 14 Part 147. Embry-Riddle holds Air Agency Certificate No. NX4T404M and FAA Repair Station Certificate No. NX42404M.

Avionics Line Maintenance Specialization Program

The Avionics Line Maintenance program provides the student with the training needed to successfully obtain the FCC General Radiotelephone Operators License (GROL) as well as receive advanced avionics training using current industry standards and procedures. Students will cover basic wiring and electronics concepts, system installations, and advanced avionics line maintenance troubleshooting.

Sources of Information

For general academic and admissions information regarding the Aviation Maintenance programs:

Aviation Maintenance Science Dept.
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114
(386) 323-5086 - or - (877) 904-3746
fax: (386) 226-6778
http://www.embryriddle.edu/amt

COURSE DESCRIPTIONS

Embry-Riddle Aeronautical University course offerings are listed in alphabetical order, according to the course designations below. Courses that may be offered at specific campus locations are notated as follows:

AAS	Applied Aviation Science
AE	Aerospace Engineering
AEL	Aerospace Electronics
AF	Air Force Aerospace Studies
AMS	Aviation Maintenance Science
AS/ASC	Aeronautical Science
AT	Air Traffic Control
AVT	Avionics Technology
BA	Business Administration
CE	Cooperative Education
CEC	Computer Engineering
CIV	Civil Engineering
COM	Communication
CS	Computer Science
EC	Economics
EE	Electrical Engineering
EGR	Engineering
EL	Electronics
EP	Engineering Physics
ES	Engineering Science
FA	Flight-Academic
HON	Honors
HF	Human Factors
HS	Homeland Security
HU	Humanities
IT	Information Technology
MA	Mathematics
MSL	Military Science and Leadership
NSC	Naval Science
PS	Physical Science
PSY	Psychology
RS	Regional Studies
SE	Software Engineering
SF	Safety Science
SIM	Simulation
SIS	Global Security and Intelligence Studies
SP	Space Studies
SS	Social Sciences
STG	Science, Technology, & Globalization
UNIV	College Success
WX	Applied Meteorology

Courses numbered 001–099 are basic skills courses and do not apply toward degree requirements. Courses numbered 100–299 are lower-division courses and are generally taken in the freshman and sophomore years. Many lower-division courses serve as prerequisites for other coursework, so students are urged to plan ahead to meet necessary prerequisites. Courses numbered 300–499 are upper-division courses, reflecting advanced levels of technical skills and disciplinary knowledge. Upper-division work is generally taken in the junior and senior years. Only the dean of a college, or an appointed designee, may waive corequisite and prerequisite requirements. The University reserves the right to administratively drop a student from a course in which prerequisite requirements have not been met.

Course numbers ending in 95 designate time-limited offerings, such as those taught by a visiting lecturer. Course numbers ending in 96 or 97 identify special sequential courses. Those ending in 98 provide students with a unique, collective program of learning activities supervised by a professor. Courses ending in 99 denote individual study between professor and student.

Numbers in parentheses, immediately following course titles and numbers, indicate lecture and laboratory hours that a class meets each week. For example, (3,3) signifies that the course consists of three lecture hours and three laboratory hours weekly.

The following courses are not necessarily offered every term, nor are they necessarily offered at all campus locations.

Course Descriptions

Applied Aviation Science

AAS 101

Applied Aviation Science College Success Seminar (1,0)
1 Credit

A course for incoming freshmen majoring or planning to major in Safety Science, Air Traffic Management, or Applied Meteorology in which students assess and develop the personal, interpersonal, intellectual, and social skills necessary to succeed in college. This course is for freshmen only and is Pass/Fail.

AAS 199-499

Special Topics in Applied Aviation Science (1,0)
1-6 Credits

Individual independent or directed studies of selected topics in Applied Aviation Science. Prerequisite: consent of instructor and the department chair. May be repeated with a change of content.

Aerospace Engineering

A grade of C or better is required in MA 241, MA 242, and either PS 150, PS 160 or PS 215, PS 216, PS 250 for entry into all AE courses. A passing grade in all

Prerequisite courses or department consent is required for entry into all AE courses.

AE 301

Aerodynamics I (3,0)
3 Credits

The atmosphere. Incompressible and compressible one-dimensional flow. Airspeed measurement. Two-dimensional potential flow. Circulation theory of lift. Thin airfoil theory. Viscous flow. Boundary layers. Finite wing theory. Drag in incompressible flow. Wing-body interactions.
Prerequisites: ES 204, ES 206, MA 243. Corequisite: ES 305.

AE 302

Aerodynamics II (3,0)
3 Credits

Laminar and turbulent flows, transition point, determination of skin friction drag on an airfoil. Obtaining equations for streamline, for particle path, and for streakline in a flow field. Compressible flow, shock waves, thermodynamics of gas flow. Reversible and irreversible processes. Changes in pressure, density, and temperature across shock waves. Isentropic duct flow and flow through a nozzle. Static performance and maneuvers in flight. Propeller theory.

Prerequisite: *AE 301.*

AE 304

Aircraft Structures I (3,0)
3 Credits

Space structures. Introduction to fuselage truss analysis and wing structural analysis. Inertia force and load factor computation for various flying and landing conditions. Elasticity and combined stress analysis. Beam bending. Area moment of inertia tensor. Shear flow in thin-walled sections. Materials considerations. Finite-element modeling and computer-aided analysis.

Prerequisite: *ES 202.*

AE 313

Space Mechanics (3,0)
3 Credits

This course presents the vector-based solution of the two-body problem and the solution for the position and time problem (Kepler's equations). These are used to analyze orbits, satellite launch, ground tracks, orbit transfer, interplanetary trajectories, and interception and rendezvous. Using three-dimensional vector dynamics, the motion and stability of rigid and semi-rigid spacecraft are studied as are the means for controlling spacecraft orientation.

Prerequisites: *ES 204, MA 345.*

AE 314

Experimental Aerodynamics (1, 0)
1 Credit

This course supports the Experimental Aerodynamics lab by providing lectures based in practice and theory. Topics include wind tunnel design, instrumentation, scaling effects, tunnel wall corrections, and data acquisition, and data reduction as well as good experimental practices. The Experimental Aerodynamics Lab AE 315 must be taken during the same semester as AE 314.

Prerequisite: *COM 221. Corequisite: AE 301.*

AE 315

Experimental Aerodynamics Laboratory (0,3)
1 credit

This laboratory consists of a sequence of experiments that demonstrate basic aerodynamic theory while developing skills in the use of classic and modern experimental apparatus, the practice of good experimental technique, and the writing of experimental reports. Specific experiments depend on apparatus availability and instructor preference. The Experimental Aerodynamics Lab, AE 315, must be taken during the same semester as AE 314.

Prerequisite: *COM 221. Corequisite: AE 301.*

AE 325

Experimental Space Systems Engineering (1,0)
1 Credit

Lecture-based course to support the Space Systems Engineering Laboratory. Course covers subsystems of spacecraft, experimental methods, data acquisition, and data reduction. The Experimental Space Systems Engineering Lab, AE 326, must be taken during the same semester as AE 325.

Prerequisite: *PS 250. Corequisite: EP 394.*

AE 326

Experimental Space Systems Engineering Laboratory (0,3)
1 Credit

Laboratory for the fundamentals of spacecraft systems. A lab covering each of the major subsystems of spacecraft, which may include propulsion, attitude control, power, telemetry and command, communications, structures and vibrations, materials and mechanisms, thermal control, and mass properties. The Experimental Space Systems Engineering Lab, AE 326, must be taken during the same semester as AE 325.

Prerequisite: *PS 220. Corequisite: EP 394.*

AE 350

Project Engineering (3,0)
3 Credits

Role of the engineer in project management with emphasis on systematic evaluation of the benefits and costs of projects involving engineering design and analysis. Proposal preparation and presentation, engineering contracts, negotiation techniques. Value engineering.

Prerequisite: *Junior class standing or consent of instructor.*

AE 401

Advanced Aerodynamics I (3,0)
3 Credits

An advanced-level presentation of the theory and applications of incompressible aerodynamics. Kinematics and dynamics of fluid flow. Flow about a body. Shock tube flow. Thin airfoil and finite wing theory. Approximation techniques; numerical methods. Introduction to compressible flow.

Prerequisites: *AE 302, MA 441.*

AE 404

Aircraft Structures II (3,0)
3 Credits

Deflection analysis of structural systems by means of virtual work principles and their energy counterparts. The Rayleigh-Ritz method. Redundant truss, frame, and stiffened web structures. Thermal loads. Shear lag. Load transfer at fuselage frames and wing ribs. Cutouts in wing and fuselage members. Shear flow in multicell wing structures. Buckling considerations.

Prerequisite: *AE 304.*

AE 408

Turbine and Rocket Engines (3,0)
3 Credits

A study of the gas turbine and rocket engines. Topics include control volumes, conservation equations, combustion processes, efficiencies, fuel consumption, nozzle flow, diffusers, ideal and real ramjets, gas turbine engines, performance of rocket vehicles, and solid and liquid propellant rocket motors.

Prerequisite: *AE 302.*

AE 409

Aircraft Composite Structures (3,1.5)
3 Credits

Introduction to reinforced plastic composite structural materials and their use in modern aircraft. Discussion of basic material properties, testing procedures, design and analysis using classical lamination theory, and fabrication techniques, including some hands-on demonstrations.

Prerequisites: *ES 202, ES 320.*

AE 411

Advanced Experimental Aerodynamics (2,3)
3 Credits

This course consists of a series of advanced experiments using a wind tunnel. Topics include model design and construction, testing procedures, control surface testing, propeller testing, the use of wind tunnel data, scale effects, complete model testing, and an introduction to supersonic testing.

Prerequisite: *AE 314.*

AE 413

Airplane Stability and Control (3,0)
3 Credits

Development of longitudinal, lateral, and directional stability and control equations. Control surface

Course Descriptions

design. Control effectiveness and size requirements. Dynamic control theory. Handling characteristics and maneuvering stability of aircraft.

Prerequisite: *MA 345. Corequisite: AE 302.*

AE 414

Space Propulsion (3,0)

3 Credits

The course provides the student with an introduction to the basic principles of liquid and solid propulsion systems. Flight performance parameters are presented for single and multistage vehicles. The thermo-chemistry of the combustion process will also be discussed. Performance enhancements of nuclear rockets and electric propulsion will be covered.

Prerequisites: *AE 301 and ES 305.*

AE 415

In-Flight Laboratory (3,1.5)

3 Credits

Development of longitudinal and lateral-directional, static and dynamic stability and excess power, rate of climb, turn rate, and load factor performance theory, with laboratory concept validations.

Prerequisite: *AE 413.*

AE 416

Aerospace Structures and Instrumentation (1,0)

1 Credit

Lecture-based course to support the Structures and Instrumentation Laboratory. Course emphasizes aerospace vehicle testing through instrumentation, data acquisition, and data reduction. Test plans and design are utilized. The Structures and Instrumentation Laboratory, AE 417, must be taken during the same semester as AE 416.

Prerequisites: *COM 221, ES 202, EE 335.*

AE 417

Aerospace Structures and Instrumentation Laboratory (0,3)

1 Credit

Principles of modern aerospace vehicle testing and instrumentation. Basic electrical measurements and devices such as strain gages, piezoelectric sensors and thermocouples. Topic could include measurement of fluid pressure and flow; temperature; thermal and transport properties; strain; motion; vibration; force and torque. Experimental static and dynamic analysis of structures. Processing and analyzing experimental data; report writing and data presentation. The Structures and Instrumentation Laboratory, AE 417, must be taken during the same semester as AE 416.

Prerequisites: *COM 221, ES 202, EE 335.*

AE 420

Aircraft Preliminary Design (3,3)

4 Credits

Airplane conceptual design principles are developed to meet modern aerodynamic, propulsion, structural and performance specifications. A complete airplane is designed, resulting in a design package consisting of specifications, aerodynamic calculations, inboard profile drawing, weight and balance, general arrangement drawing, aerodynamic drag analysis and complete performance report.

Prerequisites: *AE 314, AE 413.*

AE 421

Aircraft Detail Design (3,3)

4 Credits

Principles of aircraft detail and component part design, manufacture, and production are covered along with projects to give actual experience in the design of aircraft components. Carries the design of an airplane from the general layout to the design of its detail parts and the design of necessary tools.

Prerequisites: *AE 404, AE 420.*

AE 425

Aircraft Acoustics and Noise Control (3,0)

3 Credits

Sound wave characteristics, levels, and directivity. Hearing and psychological effects of noise. Noise control criteria and regulations. Instrumentation. Noise sources. Acoustics of walls, barriers, and enclosures. Acoustical materials and structures. Noise characteristics of jet and propeller aircraft, including helicopters.

Prerequisite: *AE 301.*

AE 426

Spacecraft Attitude Dynamics and Control (3,0)

3 Credits

Fundamentals of spacecraft attitude dynamics: three-dimensional rigid-body kinematics, stability and dynamics of symmetric and tri-inertial bodies, attitude, nutation, and spin-control maneuvers for spin-stabilized spacecraft, effects of energy dissipation, momentum biased spacecraft dynamics and stability, modeling and simulation of spin-stabilized and momentum-biased aircraft, elements of three-axis stabilized spacecraft, effects of gravity gradient, solar radiation pressure, atmospheric drag and magnetic torque on spacecraft attitude.

Prerequisites: *AE 313, MA 345.*

AE 427

Spacecraft Preliminary Design (3,3)
4 Credits

Spacecraft preliminary design principles are developed to meet mission objectives. A complete spacecraft is designed, resulting in a design package consisting of specifications; calculations; CAD drawings; weight and various subsystem budgets; and a series of trade studies, reviews, and design reports.

Prerequisites: *AE 313, EP 394, or instructor consent. Corequisite: AE 426 or instructor consent.*

AE 430

Control Systems Analysis and Design (3,0)
3 Credits

Modeling, analysis, and control of dynamical systems with aerospace applications. Transfer functions, block diagram algebra. Routh Hurwitz stability criteria. Introduction to system design using root locus, Bode and Nyquist diagrams.

Prerequisites: *EE 335, MA 345.*

AE 433

Aerodynamics of the Helicopter (3,0)
3 Credits

The development of rotating-wing aircraft and the helicopter. Hovering theory and vertical flight performance analysis. Auto-rotation, physical concepts of blade motion and control, aerodynamics and performance of forward flight. Blade stall, stability, and vibration problems. Design problems.

Prerequisites: *AE 302, MA 441.*

AE 435

Air-Breathing Propulsion Preliminary Design (3,3)
4 Credits

This course is concerned with the preliminary design, subject to specifications, of an air-breathing engine for aircraft propulsion. A complete engine is designed and presented with proposed engine layout, cycle calculations, installed performance and engine sizing information. Calculations demonstrating that the proposed engine satisfies requirements are also presented. Corequisite: AE 408 or permission of the instructor.

AE 440

Air-Breathing Propulsion Detail Design (3,3)
4 Credits

This course is concerned with the design of the various components of an air-breathing engine, starting with the general layout. The students are grouped into teams and each team is charged with the design of a major component (inlet, fan, compressor, combustor, turbine, nozzle, support systems). The components are then integrated to verify that they function together.

Prerequisite: *AE 435 or permission of the instructor.*

AE 445

Spacecraft Detail Design (3,3)
4 Credits

Principles of spacecraft detail and subsystem design, analysis, modeling, manufacture, and test are covered and incorporated into projects to give actual experience in the detail design and integration of spacecraft subsystems and systems. Integration of multiple subsystems into a single functional model is a key component of the course.

Prerequisites: *AE 304, AE 426, AE 427, AE 430, or consent of instructor.*

AE 299, 399, 499

Special Topics in Aerospace Engineering
1-6 Credits

Individual independent or directed studies of selected topics in aerospace engineering.

Prerequisite: *consent of instructor and the department chair. May be repeated with a change of content.*

Aerospace Electronics

AEL 311

Airborne Pulse Systems (3,0)
3 Credits

A technical study of airborne pulse systems to include distance-measuring equipment and secondary radar to include their operation and support.

Prerequisites: *EL 301, EL 303, and EL 307. Corequisite: AEL 313.*

AEL 312

Airborne Communications and Navigation Systems (3,0)
3 Credits

A technical study of communications and navigation systems to include their operation and support.

Course Descriptions

Prerequisites: EL 301, EL 303, and EL 307. Corequisite: AEL 313.

AEL 313

Airborne Electronics Maintenance Operations (0,6)
2 Credits

A practical application of theory to the test, evaluation, and support of airborne electronics systems.

Prerequisites: *EL 301, EL 303, and EL 307. Corequisites: AEL 311 and AEL 312.*

AEL 315

Linear Systems and Signals Analysis (3,0)
3 Credits

An intensive study of linear electronic circuits and signals using practical, theoretical, and mathematical approaches. Topics include time and frequency domain analysis of discrete and continuous time systems, and the use of the Fourier, Laplace, and Z-transforms to analyze and design these systems for communications and aerospace electronics applications.

Prerequisites: *EL 307, MA 245, and PS 250.*

AEL 316

Elements of Engineering Design and Laboratory Procedures (2,3)
3 Credits

This course is intended to familiarize the student with various theoretical and empirical design procedures including CAD/CAE to translate these designs into laboratory breadboard hardware and to observe and practice acceptable laboratory investigative procedures. The student will be required to provide and use an engineering laboratory notebook throughout this course. Project documentation will include a final, scholarly, written engineering report.

Prerequisite: *EL 307. Corequisite: AEL 315.*

AEL 321

Advanced Communications Systems Analysis (4,0)
4 Credits

An advanced course in communications techniques. Topics include modulation, filtering, distortion, spectral density and correlation, digital coding, random processes, noise, and optimization with aerospace applications.
Prerequisites: AEL 315 and AEL 316. Corequisites: AEL 322, AEL 323, and AEL 324.

AEL 322

Advanced Communications, Microwave, and Control Systems Analysis Laboratory (0,3)
1 Credit

The practical application of communications, microwave, and control system theory using applicable hardware and software. Corequisites: AEL 321, AEL 323, and AEL 324.

AEL 323

Applied Control System Analysis (2,0)
2 Credits

An intensive study of linear feedback control systems using established analytical approaches. Topics include system designation, response, stability, and compensation techniques with electronic and aircraft applications.

Prerequisite: *AEL 315. Corequisites: AEL 321, AEL 322, and AEL 324.*

AEL 324

Microwave and Radar System Analysis (2,0)
2 Credits

An advanced course in microwave theory and radar with application to airborne systems.

Prerequisite: *AEL 315. Corequisites: AEL 321, AEL 322, and AEL 323.*

AEL 401

Airborne Surveillance Systems (3,0)
3 Credits

A technical study of airborne surveillance systems to include their operation and support.

Prerequisites: *AEL 311 and AEL 312.*

AEL 402

Airborne Electronics System Integration (3,0)
3 Credits

A technical study of airborne system integration to include system operation and support.

Prerequisites: *AEL 311 and AEL 312. Corequisite: AEL 401.*

AEL 403

Advanced Space and Airborne Electronics Systems (3,0)
3 Credits

A technical study of space and airborne electronic systems to include their operation and support.

Prerequisites: *AEL 311, AEL 312.*

AEL 404

Airborne Electronics Maintenance Operations II (0,6)
2 Credits

An advanced study of support operations for airborne electronics systems to include practice, installation, regulation, and maintenance techniques.

Prerequisite: *AEL 313. Corequisites: AEL 401, AEL 402, and AEL 403.*

AEL 411

Communication and Navigation Systems (3,0)
3 Credits

A comprehensive study of airborne electronics communications and navigation systems to include their design and operation.

Prerequisites: *AEL 321, AEL 323, and AEL 324.*

AEL 412

Surveillance and Control Systems (3,0)
3 Credits

A comprehensive study of airborne surveillance and control systems to include their design and operation.

Prerequisites: *AEL 321, AEL 323, and AEL 324.*

AEL 413

Satellite Communications and Navigation Systems (4,0)
4 Credits

A comprehensive study of satellite navigation and communication systems to include their design, operation, and application.

Prerequisite: *AEL 321.*

AEL 414

System Test and Evaluation Laboratory (0,3)
1 Credit

A familiarization with state-of-the-art test systems used in the evaluation of airborne electronic components and systems. Corequisites: AEL 411 and AEL 412.

AEL 421

Aerospace Electronic System Integration and Design (3,0)
3 Credits

Design applications in aerospace electronic system integration in current airborne vehicles. Subjects include: package design, vehicle mainframe effects on design, FAA regulations and certification, agencies involved in the design, licensing, and standardization of aerospace systems, and manufacturer specifications.

Prerequisites: *AEL 411, AEL 412, and AEL 413.*

AEL 422

Integrated Logistics Support (3,0)
3 Credits

An intensive study of logistics engineering in aerospace. Study to include reliability, maintainability, and product support engineering.

Prerequisite: *MA 412.*

AEL 423

Test System Development Laboratory (0,3)
1 Credit

A familiarization with test and evaluation system development for airborne systems using industry-applicable generic test hardware and software.

Prerequisites: *AEL 411, AEL 412, and AEL 414. Corequisite: AEL 421.*

AEL 424

Senior Project (2,2)
3 Credits

Capstone project that includes the use of theory and practice learned to design and implement a space or airborne electronic system.

Prerequisite *or corequisites: AEL 421.*

Air Force Aerospace Studies

AF 101

The Foundation of the U.S. Air Force (General Military Course) (1,0)
1 Credit

A survey course designed to introduce students to the U.S. Air Force and Air Force Reserve Officer Training Corps. Featured topics include mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer career opportunities. Leadership Laboratory is mandatory for Air Force ROTC cadets and complements this course by providing cadets with followership experiences. Corequisite: AF 101L.

AF 102

The Foundation of the U.S. Air Force (1,0)
1 Credit

Continuation of AF 101. Topics include Air Force core values, leadership principles, group leadership

Course Descriptions

dynamics, and an introduction to communication skills. A weekly Leadership Laboratory is mandatory. Corequisite: AF 102L.

AF 101L/AF 102L

Leadership Laboratory (0,2)
0 Credit
Consists of Air Force customs, courtesies, leadership, teamwork, field training orientation, drill, and ceremonies. Includes a mandatory physical fitness program. These courses are graded Pass/Fail.

AF 201

The Evolution of USAF Air and Space Power (General Military Course) (1,0)
1 Credit
The AF 201 course is designed to examine the aspects of air and space power through a historical perspective. Using this perspective, the course covers a time period from the first balloons and dirigibles to the Air and Space applications employed at the beginning of the Cold War. Historical examples are studied to extrapolate the fundamentals of air power, including the tenets of Air and Space Power, Principles of War, and Air Force competencies, functions, and doctrine. In addition, the students will continue to discuss the importance of the Air Force core values, through the use of operational examples and historical Air Force leaders, and will continue to develop their communication skills. Leadership Laboratory is mandatory for AFROTC cadets and complements this course by providing cadets with followership experiences.

AF 202

The Evolution of USAF Air and Space Power (General Military Course) (1,0)
1 Credit
Continuation of AF 201. This course continues to explore Air Force history, beginning with the Vietnam era and culminating with the modern air and space applications employed during Operations Iraqi and Enduring Freedom. A weekly Leadership Laboratory is mandatory.

Corequisite: *AF 202L.*

AF 201L/AF 202L

Leadership Laboratory (0,2)
0 Credit
Consists of Air Force customs, courtesies, leadership, teamwork, drill, ceremonies, and field training orientation. Includes a mandatory physical fitness program. These courses are graded Pass/Fail.

AF 301

Air Force Leadership Studies (Professional Officer Course) (3,0)
3 Credits
A study of leadership, management fundamentals, professional knowledge, Air Force personnel evaluation systems, leadership ethics, and the communication skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical applications of the concepts being studied. A mandatory Leadership Laboratory complements this course by providing advanced leadership experience in officer-type activities, giving students the opportunity to apply the leadership and management principles of this course.

AF 302

Air Force Leadership Studies (Professional Officer Course) (3,0)
3 Credits
Continuation of AF 301. A weekly Leadership Laboratory is mandatory.

Corequisite: *AF 302L.*

AF 301L/AF 302L

Leadership Laboratory (0,2)
0 Credit
Provides advanced leadership experience in officer-type activities, giving students the opportunity to apply leadership and management principles. Includes a mandatory physical fitness program. These courses are graded Pass/Fail.

Prerequisites: *completion of the General Military Course or Two-Year Program selection and/or approval of the professor of Aerospace Studies.*

AF 401

Preparation for Active Duty (Professional Officer Course) (3,0)
3 Credits
Examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest focus on the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Continued emphasis is given to the refinement of communication skills. An additional

Leadership Laboratory complements this course by providing advanced leadership management principles.

Corequisite: *AF 401L.*

AF 402

Preparation for Active Duty (Professional Officer Course) (3,0)

3 Credits

Continuation of AF 401. A weekly Leadership Laboratory is mandatory. Corequisite: AF 402L.

AF 401L/AF 402L

Leadership Laboratory (0,2)

0 Credit

Provides advanced leadership experiences in officer-type activities, giving students the opportunity to apply leadership and management principles. Includes a mandatory physical fitness program. These courses are graded Pass/Fail.

Prerequisites: *completion of the General Military Course or Two-Year Program selection and/or approval of the professor of Aerospace Studies.*

AF 403L/AF 404L

Leadership Laboratory (0,2)

0 Credit

Mandatory. Provides advanced leadership experiences in officer-type activities. Includes a mandatory physical fitness program.

Prerequisites: *completion of the POC. These courses are graded Pass/Fail.*

Aviation Maintenance Science

The Aviation Maintenance Science courses are taught on an "A" and "B" term basis every semester of the year. For this reason, the hours shown for weekly class and lab time will be noticeably higher than for other courses in this catalog.

AMS 101

Maintenance Mathematics and Physics (10,0)

2 Credits

The fundamentals of mathematics and physics as applied to an aviation format that includes technical math (fractions, decimals, ratio, geometry, formulae, and proportions) and basic concepts of aviation applied physics (atmospheric properties, thermodynamics, fluid power, heat, power, work, machines, and sound).

AMS 102

Aircraft Familiarization (10,0)

2 Credits

Theory of aerodynamics and corrosion control involving the physical properties necessary as well as the types of structures and airplanes they are found in is discussed along with the associated safety procedures and aircraft ground operations found in today's aviation profession.

AMS 103

Tools, Materials, and Processes (8,7)

2 Credits

The development of skills in the use of basic mechanic's hand tools, hardware, safety methods, and the fabrication and installation of fluid lines and fittings through the introduction of tools, hardware, and materials used in aircraft maintenance and repair. Also, various methods of nondestructive testing are studied and applied to various practical situations.

AMS 111

Regulations, Documentation, and Drawing (15,0)

3 Credits

A presentation of the privileges and limitations of the FAA's Federal Aviation Regulations (FAR) Parts 43, 65, and 91 pertinent to aircraft maintenance and the associated documents, publications, and records applicable to the maintenance technician. Also included is weight and balance for aircraft. Also introduced is basic mechanical drawing and blueprint reading for the technician.

AMS 112

Fundamentals of Electricity (8,7)

3 Credits

An introduction to direct and alternating current electricity, electrical circuit design and measuring devices, transformers, and electronic devices and applications. Emphasis will be on voltage, current, resistance, and impedance relationships. Lectures are reinforced with laboratory projects.

AMS 121

Electrical Power Systems I (5,5)

2 Credits

The theory behind aircraft wiring, basic electrical lighting in airframe systems, and DC electrical power systems, generators, and batteries is developed in depth through the use of laboratory projects and classroom material.

Course Descriptions

Prerequisite: AMS 112.

AMS 122

Metallic Structures (10,10)
2 Credits

A study of aircraft metallic structures with emphasis on aluminum sheet metal applications and their manufacture, repair, and inspection. Through an intensive lab project and in-depth theory discussions, the student will come to understand metal-working processes and skills necessary for airworthy manufacture and repair.

***Prerequisites°:** AMS 101, AMS 102, AMS 103, AMS 111.*

AMS 123

Instruments and Avionics (8,2)
2 Credits

An overview of current aviation electronic systems (avionics), electromechanical instrumentation, and antenna installation practices. Additional theory of today's electronic instruments and flight management systems, including autopilot, will also be discussed.

***Prerequisites:** AMS 102, AMS 112.*

AMS 131

Composite Materials and Processes (6.5,6)
2 Credits

The fabrication, repair, finishing, and safety practices relating to plastic and composite materials found in current structural applications on aircraft. Labs involve the student with the application of plastic resin, adhesives, vacuum bagging, and nondestructive inspection of composite parts.

***Prerequisites:** AMS 102, AMS 103, AMS 111.*

AMS 132

Aircraft Systems I (6.5,6)
2 Credits

Classroom theory and practical application will involve the operating, service, and line maintenance of heating, cooling, pressurization, oxygen, fire warning, and various fuel systems found in current regional jets.

***Prerequisites:** AMS 101, AMS 102, AMS 103, AMS 111, AMS 112.*

AMS 133

Aircraft Systems II (8,7)
2 Credits

Operating principles and basic troubleshooting techniques for hydraulic and pneumatic components and systems will be discussed in the class, with practical lab situations for reinforcement. Component maintenance, repair, and overhaul will be emphasized for landing gear, anti-skid, and braking systems found in today's turbine-powered aircraft.

***Prerequisites:** AMS 102, AMS 103, AMS 112.*

AMS 241

Classic Structures (4,3.5)
2 Credits

Wood structures, fabric coverings, welded repairs, gas as well as electric, and aircraft painting are discussed in the classroom, supported by practical application projects in the laboratory for support and better understanding by the student.

***Prerequisites:** AMS 103, AMS 111, AMS 112.*

AMS 242

Airframe Maintenance Practices (6.5,6)
2 Credits

The application of FAA type certificate data sheets, aircraft records, maintenance publications, and Federal Regulations pertinent to airframe inspections that are required by both general and commercial aviation aircraft are covered in theory and applied on Embry-Riddle flight line aircraft. This includes rigging and assembly techniques that are found in current general aviation and jet-type aircraft.

***Prerequisites:** AMS 103, AMS 111, AMS 112.*

AMS 243

Electrical Power Systems II (9,8.5)
2 Credits

The maintenance, repair, and overhaul of electrical power system components and advanced aircraft electrical systems are addressed in the classroom and the laboratory. Jet-type aircraft systems found in current production aircraft are covered through classroom and computer-based instruction.

***Prerequisites:** AMS 103, AMS 111, AMS 121.*

AMS 251

Introduction to Powerplants (8,7)
2 Credits

Reciprocating engine disassembly, inspection, and reassembly procedures are practiced in the lab. In the classroom the study of the theory of these procedures and techniques for reciprocating aircraft engine components and their operation are discussed with emphasis on the design, FAA regulations, and mechanic limitations found in the aviation industry.

Prerequisites: *AMS 101, AMS 102, AMS 103, AMS 111.*

AMS 252

Fuel, Air, and Exhaust Systems (5,5)

2 Credits

Provides an in-depth study of reciprocating engine fuel metering and distribution, superchargers, heat exchangers, and exhaust manifolds, which are applied to the maintenance, repair, and overhaul of operating reciprocating engine components. Fuel control units and their system operation as it pertains to jet aircraft are also covered.

Prerequisites: *AMS 102, AMS 103, AMS 111.*

AMS 253

Powerplant Electrical Systems (6.5,6)

2 Credits

The operating principles of the powerplant ignition system and components found on reciprocating and turbine engine powered aircraft are covered. Included are various powerplant electrical systems: fire detection and extinguishing, DC twin generator systems, and AC generator systems. Auxiliary power units, their operation, and their components are discussed in depth, with the emphasis on systems theory technology. Lab work covers the maintenance, repair, and overhaul of a magneto.

Prerequisites: *AMS 101, AMS 102, AMS 103, AMS 111, AMS 112, AMS 121.*

AMS 361

Turbine Engines (10,12.5)

3 Credits

A study of the construction and design of modern gas turbine engines used in the current generation of airplanes and helicopters. Turbine engine systems will be studied, including lubrication, fuel scheduling, starting, and ignition. Heavy emphasis will be placed on maintenance, repair, inspection, and troubleshooting techniques.

Prerequisites: *AMS 251, AMS 253.*

AMS 362

Propeller Systems (7.5,7.5)

3 Credits

Maintenance, repair, and overhaul theory and practices on propellers and their system components is covered as it pertains to reciprocating and turboprop engines found in today's regional aircraft.

Prerequisites: *AMS 101, AMS 102, AMS 103, AMS 111, AMS 121.*

AMS 371

Powerplant Inspection and Line Maintenance (10,10)

3 Credits

Operational maintenance and troubleshooting procedures for reciprocating powerplants and powerplant systems are studied in a "real" environment using the 12 engine test stands found on the flight-line. Students get hands-on turboprop engine time with the PT-6 and the Garrett 331 operational test stands also found on the flight-line.

Prerequisites: *AMS 121, AMS 251, AMS 252, AMS 253, AMS 362.*

AMS 372

Engine Maintenance, Repair, and Overhaul (10,7.5)

3 Credits

Under the auspices of the FAA Repair Station organization, the student will find invaluable the real learning situation in this lab. The practical and theoretical side is supported through classroom interaction and includes the study of the procedures and acceptable techniques used in engine disassembly, inspection, repair, and reassembly. The use of advanced techniques of nondestructive testing and the recording and return-to-service procedures necessary are covered.

Prerequisites: *AMS 251, AMS 253.*

AMS 380

Radio Communication Theory and Application (2,0)

2 Credits

This course is designed to increase previously learned electronics theory obtained during the course of study toward the A&P certificate or formal basic electronic theory classes. Upon completion of this course the student will be able to pass the FCC General Radio Telephone Examination (Elements 1 & 3).

Prerequisites: *AMS 112, AMS 121, AMS 243, or A&P Certificate.*

Course Descriptions

AMS 384

General Aviation Avionics Systems Integration

4 Credits

This course is a study of aviation electronic equipment with hands-on wiring and system testing. Emphasis will be placed on avionics system installation and the block diagrams of individual appliances. Complete wiring of an Allied Signal Silver Crown avionics suite and a GPS unit is a requirement of the class. Upon completion of this course, the student will be able to understand operation, testing, and troubleshooting of general aviation avionics systems and wiring concepts.

Prerequisites: *AMS 112, AMS 121, AMS 243, or A&P Certificate.*

AMS 388

Air Transport Avionics Systems Line Maintenance

6 Credits

This course is an advanced course in aircraft wiring and air transport avionics systems with hands-on wiring and testing. This is the capstone course of the AMS 380 to 388 series and will concentrate on corporate and airline maintenance and troubleshooting. Included in this effort will be the use of advanced ramp test equipment and wiring concepts.

Prerequisites: *AMS 112, AMS 121, AMS 243, or A&P Certificate.*

Aeronautical Science

AS 120

Principles of Aeronautical Science (3,0)

3 Credits

An introductory course in Aeronautical Science designed to provide the student with a broad-based aviation orientation in flight-related areas appropriate to all non-Aeronautical Science degree programs. Subjects include historical developments in aviation and the airline industry, theory of flight, airport operations, aircraft systems and performance, elements of air navigation, basic meteorology theory, air traffic principles, flight physiology, and aviation regulations and safety. Not available to Aeronautical Science students or to students with FAA flight certificates.

AS 132

Basic Aeronautics I (3,0)

3 Credits

This course examines the basics of pilot certification, aircraft systems and instrumentation, aerodynamics, aircraft performance, VFR cross-country navigation techniques as they apply to single-engine operations, and weather reports and forecasts. This course includes the Federal Aviation Regulations, the NTSB, elements of resource management, hazardous attitudes, and aviation physiology.

AS 133

Basic Aeronautics II (3,0)

3 Credits

This course includes the Federal Aviation Regulations, the NTSB, elements of resource management, hazardous attitudes, and aviation physiology. Multi-engine operations will be covered, including aerodynamics, performance, certification, and emergency considerations. At the completion of this course the student will have received the aeronautical knowledge necessary for certification as a private pilot with single-engine and multi-engine land ratings.

Prerequisite: *AS 132.*

AS 142

Private Helicopter Operations (3,0)

3 Credits

During this course the student obtains the foundation for all future helicopter aviation training. The student will be introduced to helicopter fundamentals of flight, and will become familiar with basic flight maneuvers and operating procedures. Emphasis will be placed on developing a safe and competent pilot who is adequately prepared for solo, cross-country, and night operations. The student will receive training in safety awareness, crew resource management, and aeronautical decision-making. By the end of the course, the student will have met the aeronautical knowledge requirements to take the FAA Private Pilot, Rotorcraft-Helicopter, Written Knowledge Test.

Prerequisites: *None.*

AS 232

Intermediate Aeronautics (3,0)

3 Credits

This course will examine instrument flying in the National Airspace System below 18,000 feet, Federal Aviation Regulations, single-engine complex and light multi-engine aircraft performance, instrument approach procedures, weather related to instrument flying, and the elements of resource management. The student will also receive preparation to take the FAA Instrument Rating written test.

Prerequisite: *AS 133.*

AS 242

Commercial Helicopter Operations (3,0)
3 Credits

The student will develop an in-depth knowledge of helicopter components, functions, systems, aerodynamics, and performance at the commercial pilot level. The student will also gain necessary knowledge on en route flight to include weather, navigation, and regulations. By the end of the course, the student will have met the aeronautical knowledge requirements to take the FAA Commercial Pilot, Rotorcraft-Helicopter written knowledge test.

Prerequisite: *AS 142 or FAA Private Pilot Certificate with Rotorcraft-Helicopter Rating.*

AS 254

Aviation Legislation (3,0)
3 Credits

This course examines the evolution of federal civil aviation regulations in the United States. It provides an overview of the past and present problems prompting regulation of the industry, the resultant safety legislation, airport development funding legislation, and international aviation legislation.

AS 272

Advanced Aeronautics (2,0)
2 Credits

This course examines multi-engine flying in the IFR environment including the high-altitude en route structure, turbo-charged piston twin-engine airplane and turbo-prop airplane performance, winter flying phenomena, mountain flying, effective resource management, and safe flying practices. The student will also receive preparation to take the FAA Commercial Pilot written test.

Prerequisite: *AS 232.*

AS 309

Aerodynamics (3,0)
3 Credits

Incompressible flow airfoil theory, wing theory. Calculation of stall speed, drag, and basic performance criteria. Configuration changes, high and low speed conditions. Special flight conditions. Introduction to compressible flow. Corequisite: PS 104.

AS 310

Aircraft Performance (3,0)
3 Credits

Aerodynamic performance of aircraft powered by reciprocating, turboprop, or jet turbine engines. Stability and control, weight and balance and operating data.

Prerequisite: *AS 309. Corequisite: AS 311.*

AS 311

Aircraft Engines-Turbine (3,0)
3 Credits

A comprehensive study of aircraft gas turbine engine fundamentals and theory at the technical level. Areas of study include background, types, variations, and applications; engine theory; construction and design; systems and accessories; representative engines. Corequisite: PS 104.

AS 313

Resource Management-An Instrument Pilot Perspective (1,0)
1 Credit

A review of the fundamentals of resource management followed by application to the single-pilot IFR environment. Includes classroom exercises allowing student demonstration and practice of basic resource management theory. Includes preview/perspective of future resource management training.

Prerequisites: *AS 213, FA 251. Corequisite: FA 304.*

AS 320

Commuter Aviation (3,0)
3 Credits

This course acquaints the student with the development, administrative policies, and operational factors peculiar to commuter aviation, especially since passage of the Airline Deregulation Act of 1978. The impact of mergers and acquisitions, profiles of passenger and cargo carrying commuters, and analysis of commuter successes and failures are discussed. Emphasis is placed on the establishment of a new commuter airline, which includes market and financial analysis, the company plan, aircraft selection and acquisition, route structure and timetable, marketing strategy, and pertinent regulatory requirements. The course culminates in a formal proposal soliciting for venture capital to start a commuter airline.

Prerequisite: *BA 201.*

Course Descriptions

AS 340

Instructional Design in Aviation (3,0)

3 Credits

The application of the method of scientific inquiry to the process of instruction in aviation is presented. This means the systematic design of instruction, based on knowledge of the learning process, taking into account as many factors about the particular situation as possible. Special emphasis will be placed on examining instructional problems and needs in aviation, setting a procedure for solving them, and then evaluating the results. Recommended Prerequisite: Commercial Pilot Certificate with Instrument Rating.

AS 342

Instrument Helicopter Operations (3,0)

3 Credits

This course will examine helicopter instrument flying in the National Airspace System below 18,000 feet. Federal Aviation Regulations, helicopter performance for instrument flight, instrument approach procedures, weather related to instrument flying, en route navigation, and the elements of resource management. By the end of the course, the student will have met the aeronautical knowledge requirements to take the FAA Instrument, Rotorcraft-Helicopter written knowledge test.

Prerequisite: *AS 142 or FAA Private Pilot Certificate with Rotorcraft-Helicopter Rating.*

AS 346

Advanced Navigation (3,0)

3 Credits

This course continues the flight planning and navigation procedures started in AS 246. It brings the student into long-range IFR operations. Planning, FAR Part 121 regulations, routes, oceanic air traffic control procedures, instrument approach procedures, and emergency considerations are applied to U.S. and international operations. The student is introduced to ground-based radar surveillance and the Global Positioning System.

Prerequisites: *AS 246, AS 310.*

AS 350

Domestic and International Navigation (3,0)

3 Credits

This course will study FAR Part 121 domestic and flag regulations and evaluate their impact on long-range domestic and international flights. The student will be able to use ICAO, JAA, and FAA operational requirements and typical air carrier Ops SPECS to plan domestic and transoceanic flights. CBT simulation programs may be used as necessary to demonstrate actual flight scenarios. High-altitude airspace, navigation, and approach procedure chart interpretation will be examined in detail. Students will study and use the concepts of MNPS and RVSM airspace, dispatch procedures, ETOPS, ETP, driftdown, track messages, LRN accuracy checks, Oceanic Air Traffic Control clearances, international METARs and TAFs and emergencies and contingencies while on oceanic tracks. Communication systems requirements and methodology will be examined to include satellite, digital, and analog devices.

Prerequisites: *AS 310 and AS 232 or Instrument Rating.*

AS 356

Aircraft Systems and Components (3,0)

3 Credits

A comprehensive study of aircraft systems and components at the technical level. Areas of study include aircraft electrical, hydraulic, fuel, propeller, and auxiliary systems including theory of operation, calculations, and related Federal Aviation Regulations.

Prerequisite: *PS 104.*

AS 357

Flight Physiology (3,0)

3 Credits

Aeromedical information. Causes, symptoms, prevention, and treatment of flight environment disorders. Altitude effects, spatial disorientation, body heat imbalance, visual anomalies, and psychological factors are included as they relate to pilot performance and survival effectiveness.

Prerequisite: *sophomore standing.*

AS 358

Advanced Avionics (3,0)

3 Credits

The student will be taught the electronic characteristics of communications, navigation, and surveillance equipment both on the ground and in the aircraft. This will include historical information leading to the current systems. Systems and concepts taught will include ADF, VOR, INS, IRS, GPS, ILS, VHF and UHF communications, SATCOM, ACARS, TCAS, EGPWS, transponders (Mode A, C, and S), ADS and ADS-B, TLS, free flight and weather radar. Since this area is very dynamic, new systems will be introduced as they are designed and perfected.

Prerequisites: *PS 104 and AS 232 or Instrument Rating.*

AS 380

Pilot Career Planning and Interviewing Techniques (1,0)
1 Credit

A course in which students will discuss and develop short-term and long-term job and career goals, conduct career research using various University and industry resources, prepare a personal job search portfolio, prepare resumes and letters of application, and gain insights and proficiency in interviewing skills so they are better prepared to enter the job market upon graduation. Students will participate in simulated interview scenarios, will be expected to correspond with at least one company, and will be involved in the evaluation of letters, resumes, and interviews. This course will be graded pass/fail.

Prerequisite: *junior standing.*

AS 387

Crew Resource Management (3,0)
3 Credits

A capstone course designed to develop a detailed understanding of the organizational behavior, interpersonal relationships skills, and other critical behavioral dynamics of professional flight crews. The course builds upon the knowledge of crew resource management (CRM) acquired during the student's private, instrument, and commercial pilot certification training. The history of CRM, CRM concepts of communication processes, problem solving, group dynamics, workload management, and situational awareness will be investigated. Aircraft incidents and accidents related to the evolution of CRM training programs and FAA regulations will be analyzed. Intrapersonal and psycho-motor skills will be addressed as they relate to safe, legal, and efficient flight operations.

Prerequisites: *AS 350 and PSY 220.*

AS 402

Airline Operations (3,0)
3 Credits

A study of the scope and function of a major air carrier's organizational structure and the specific relationships of the operations department with those of marketing, maintenance, and safety are discussed. A study of corporate issues including the industry in general, market structure, certification, FAR Part 121 Regulations, economic issues, mergers, corporate culture, and international topics will be included. From an operational perspective, topics include flight operations employment policies, domiciles, operating specifications, types of services provided, training, passenger considerations, decision making, communications, and pertinent FARs.

AS 405

Aviation Law (3,0)
3 Credits

This course will introduce the advanced student to the U.S. Constitution as well as to federal, state, and local statutes. The student will become familiar with case law and common law and develop an understanding of the chronological development of these laws and their application to aviation. The student will be introduced to civil law, including tort, product liability, contract, sales, secured credit, property, environmental, and labor laws. Criminal statutory law and government, airman, and operator rights and liabilities will also be studied, as well as international laws and conferences.

Prerequisite: *junior standing.*

AS 408

Flight Safety (3,0)
3 Credits

A capstone course designed to assist the student in developing an attitude and philosophy for accident prevention. The course includes ideal and practical, personal and organizational safety procedures and goals; safety philosophies; aircraft accident reports; human factors; principles of accident investigation, accident prevention programs, and accident statistics; current events; and NTSB special studies.

Prerequisite: *senior standing.*

AS 410

Airline Dispatch Operations (3,0)
3 Credits

This capstone course includes a review of pertinent Federal Aviation Regulations, navigation systems and procedures, manual flight planning, emergency and abnormal procedures, the general operating manual, aircraft systems and performance development, human factors, and practical dispatching applications.

Prerequisite: *AS 310. Corequisites: AT 300, WX 352. (AT 300 and WX 352 are only applicable for those students in the Dispatcher Program.)*

AS 411

Jet Transport Systems (3,0)
3 Credits

This course will provide the student with detailed knowledge of jet transport category aircraft systems.

Course Descriptions

The student will learn how to operate typical jet transport category aircraft systems in both normal and emergency situations.

Prerequisite: *AS 356.*

AS 412

Corporate and Business Aviation (3,0)

3 Credits

Operation of a corporate flight department. Value of management mobility. Aircraft and equipment evaluation, maintenance, flight operations, administration, fiscal considerations.

AS 413

Resource Management-The Crew Perspective (1,0)

1 Credit

A brief historical overview of crew resource management followed by a study of recent major and regional carrier accidents and direct application of crew resource management fundamentals that were used or not used. Classroom team exercises allow student demonstration and practice of basic resource management theory, specifically applied to the three-person crew of a Boeing 727. Additionally, students are challenged with crew resource management theory applications by the major carriers today and applications to each student's private lives and careers.

Prerequisites: *AS 313, FA 418. Corequisite: FA 420.*

AS 420

Flight Technique Analysis (3,0)

3 Credits

Application of aerodynamic principles to the development of optimal pilot techniques and procedures. Uniform procedures applicable to all airplanes and special procedures for large, high-performance, and transport aircraft are analyzed, including principles of flight deck resource management.

Prerequisite: *AS 310.*

AS 425

Autopilots and Flight Management Systems (3,0)

3 Credits

Principles, systems analysis, operations of flight directors with mechanical, CRT, LCD, and head-up displays, autopilots, automatic flight control systems with auto throttle, auto land, go-around functions, stability augmentation devices, and flight management systems.

Prerequisites: *AS 346, AS 358.*

AS 435

Electronic Flight Management Systems (3,0)

3 Credits

This course teaches the theory and principles governing flight with autopilot and flight management systems. Students will apply theory and principles by demonstrating good decisions and thought processes in autopilot and FMS/PC simulators.

Prerequisites: *AS 358, AS 350.*

AS 442

Flight Instructor Helicopter Operations (3,0)

3 Credits

The theory and proper techniques of instruction and helicopter private and commercial pilot knowledge will be presented. The student will develop, plan, and give practice instruction on topics for private and commercial pilot helicopter pilots. By the end of the course, the student will have met the aeronautical knowledge requirements to take the Fundamentals of Instruction and CFI-Helicopter written knowledge tests.

Prerequisites: *AS 242 or FAA Commercial Pilot Certificate and Rotorcraft-Helicopter Rating.*

AS 471

All-Attitude Flight and Upset Recovery

1 Credit

Introduction to all-attitude flight and upset recovery using flight simulation software running on high-performance personal computers. Analysis of selected loss-of-control and controlled-collision-with-ground accidents. Simulated training in inverted flight, low-altitude steep bank and pitch maneuvers upright and inverted, and aerobatics in a high-performance jet airplane. Study of upset training techniques in a transport-type airplane as taught in several major airline/aircraft manufacturing companies. Simulated upset recovery training in a heavy jet transport aircraft from nose-high and nose-low attitudes at various bank angles.

Prerequisites: *AS 309, Pilot Certificate with Instrument Rating.*

AS 199, 299, 399, 499

Special Topics in Aeronautical Science

1-3 Credits

Individual independent or directed studies of selected topics in general aviation.

Prerequisites: *consent of instructor and approval of department and program chairs. May be repeated with a change of subject. Special topics courses involving flight* *training are offered in selected areas for the purpose of gaining proficiency in required pilot operations for various certificates and ratings.*

Prerequisite: *approval of chief flight instructor and department chair.*

ASC 101

Aeronautical Science Student Success Seminar (1,0)

1 Credit

Aeronautical Science Student Success is a course in which students assess and develop the personal, interpersonal, intellectual, and social skills necessary to succeed in college. Time management, study skills, goal clarification, career concerns, and college resources will be included. This course is available to Aeronautical Science freshmen only.

Air Traffic Control

AT 300

Air Traffic Management I (3,0)

3 Credits

AT 300 is the entry-level course in the Air Traffic Management (ATM) degree sequence. It is also the first of the courses required in the FAA's Collegiate Training Initiative (CTI) program the FAA is using to meet ATC staffing requirements. This course provides students with a fundamental knowledge of the U.S. air traffic control system and develops content knowledge in the following areas: (a) the Federal Aviation Administration, its mission, organization, and operation; (b) the air traffic control career; (c) navigational aids, current and future; (d) airspace; (e) communications; (f) federal aviation regulations; (g) ATC procedures; (h) control tower operations; (i) nonradar operations; (j) radar operations; and (k) future air traffic control systems. The course also provides essential information that is useful for pilots and other aviation professionals.

Prerequisite: *AS 120 or AS 132.*

AT 302

Air Traffic Management II (3,0)

3 Credits

Air Traffic Management II provides the student with an introduction to the manuals, procedures, maps, charts, and regulations used by pilots and air traffic controllers in the National Airspace System (NAS). Included is an examination of FAA Orders, the Aeronautical Information Manual (AIM), and Federal Air Regulations (FARs). Students will also acquire basic knowledge about SIDs, STARs, en route IFR charts, and instrument approaches. Search and rescue, special operations, NOTAMS, and teamwork in the ATC environment are also studied in this course.

AT 305

Air Traffic Management III (3,0)

3 Credits

This course covers the basic air traffic control (ATC) procedures for instrument flight rules (IFR) in the en route and terminal ATC facilities in the National Airspace System (NAS). Knowledge and skill requirements for air traffic control specialists (ATCS) in the current ATC system are studied in the classroom and practiced in a realistic, performance-based laboratory environment. Duties and responsibilities of the Tracon air traffic controller are integrated into an understanding of how the total ATC system works. Classroom delivery is augmented by practical laboratory problems using an air traffic control simulation of terminal radar operations.

Prerequisite: *AT 300.*

AT 315

Air Traffic Management-VFR Tower (2.5,1)

3 Credits

AT 315 is the air traffic control VFR Tower segment in the Air Traffic Management (ATM) degree sequence. It is one of the courses required in the FAA's Collegiate Training Initiative (CTI) program the FAA is using to meet ATC staffing requirements. This course provides students with a fundamental knowledge of VFR Tower terminal operations in the U.S. air traffic control system and develops content knowledge in the following areas: (a) control tower equipment and operating positions; (b) the airport traffic area; (c) navigation aids; (d) airspace; (e) VFR traffic patterns; (f) controller/pilot phraseology; (g) aircraft taxi instructions; (h) control of vehicle movement; (i) interagency communications and intrafacility coordination; (j) federal aviation regulations; (k) notification and handling of emergency aircraft; (l) flight progress strip marking; (m) aircraft recognition and characteristics; (n) limited weather observations; (o) airport lighting systems; (p) wake turbulence and its effects on arriving/departing aircraft; (q) VFR and IFR ATC procedures; (r) runway incursions; (s) using ATIS; (t) reporting RVR/RCR; (u) determining prevailing visibility using visual reference; (v) NOTAMs; (w) and criteria for runway selection. The course also provides essential information that is useful for pilots and other aviation professionals.

Course Descriptions

Prerequisites: *AT 300 and AT 305. Corequisite: AT 315L.*

AT 315L

Air Traffic Management VFR Tower Laboratory
0 Credits

This laboratory is designed to complement AT 315. Corequisite: AT 315.

AT 401

Air Traffic Management IV (2,3)
3 Credits

This course integrates the knowledge of traffic control gained in previous air traffic control courses with an opportunity to actually "work" in air traffic control operating positions. Using a realistic air traffic control simulation (TRACON/ProTM), students issue instructions to aircraft, make hand-offs, coordinate with other controllers, solve aircraft confliction problems, and do other controller tasks. The ability to make "real-time" decisions, determine strategies for controlling aircraft, and working with a dynamic scenario are features unique to this learning experience. This course combines classroom discussion and group and team coordination with various forms of evaluation for course credit. Student competency in the performance phase of the course is determined by computer scoring.

Prerequisites: *AT 300, AT 305.*

AT 405

Air Traffic Management V (2,3)
3 Credits

A capstone course in the ATC Minor that expands on the skills, knowledge, and abilities the student has acquired in previous ATC classes. This course presents more demanding and complex traffic scenarios requiring higher-level performance and decision-making skills and prepares the student for initial training in any ATC specialization. Students will also gain an appreciation for the challenges of implementing large-scale changes in the National Airspace System. Upon successful completion of this course, students will demonstrate the knowledge and technical aptitude required for entry-level qualification as an air-traffic control specialist.

Prerequisites: *AT 300, AT 305, AT 401.*

Avionics Technology

AVT 301

Introduction to Avionics (3,0)
3 Credits

A survey course designed to provide a basic knowledge of electronics with application to avionics for the nonavionics major.

AVT 330

Simulation Maintenance Technician (2,3)
3 Credits

This course is an introduction to simulator types, FAA regulations germane to simulators, and actual operation of different types of simulators. Types of display devices, computer languages, support systems, inspection techniques, and troubleshooting procedures will be offered in the classroom and laboratory environment. Corequisite: AEL 311, AEL 312, or permission of the department chair.

Business Administration

Standing is based on credit hours earned toward the student's declared degree program.

BA 101

Introduction to Business Programs and Careers (3,0)
1 Credit

The student will assess and develop the personal and interpersonal dynamics and intellectual and social demands necessary to succeed in college. Time management, study skills, goal clarification, career concerns, and college resources are included in the course. Different aspects of careers and areas of concentration in business will be discussed in depth. This course is graded Pass/Fail and is available to freshmen only.

BA 105

American Business Enterprise (3,0)
3 Credits

The course examines the issues, foundations, and environment of the business enterprise system. Business financing, production, marketing, and employee relations are stressed. Not available to Aviation Business Administration students.

BA 120

Introduction to Computer-Based Systems (3,0)
3 Credits

An overview of computing in the business environment, and an introduction to the tools, techniques, and strategies of computer-based information system development. The emphasis is on developing computer literacy through the use of computers in the design and presentation of business communications such as plans, proposals, spreadsheets, graphs, and charts.

BA 201

Principles of Management (3,0)
3 Credits

Provides an overview of relevant management principles and practices as applied in contemporary organizations. Focuses on management theories, philosophies, and functions.

BA 210

Financial Accounting (3,0)
3 Credits

An introduction to accounting information systems and financial reports, including accounting concepts and analysis and interpretation of financial reports with an emphasis on the operating activities of aviation-related businesses.

BA 212

Advanced Financial Accounting (3,0)
3 Credits

An in-depth study of accounting information systems and financial reports used in a management environment, analyzing and interpreting financial reports with an emphasis on the operating, investing, and financing activities of all types of organizations, including airline and aviation related companies.

Prerequisites: *Financial Accounting and sophomore standing.*

BA 221

Advanced Computer-Based Systems (3,0)
3 Credits

This course is a continuation of BA 120. It covers advanced concepts of spreadsheet use, database management systems, and presentation graphics. Students perform macro and command language programming in applications packages. In addition, the course provides experience in locating and retrieving graphical and text-based information from the Internet to support management activities.

Prerequisite: *computer skills.*

BA 308

Public Administration (3,0)
3 Credits

Characteristics of organization and management in government; impact of political processes and public pressures on administration action; role of regulatory agencies; governmental personnel and budgetary procedures; unique qualifications of the public administrator.

Prerequisites: *Management and sophomore standing.*

BA 311

Marketing (3,0)
3 Credits

Marketing theory; marketing management, sales management; market research. Public and customer relations, advertising, distribution.

Prerequisite: *sophomore standing.*

BA 312

Managerial Accounting (3,0)
3 Credits

Emphasizes management's use of cost information in internal decision-making. Decision-making processes include cost analysis, control, allocation, and planning. A variety of accounting techniques applicable to aviation/aerospace companies are presented.

Prerequisites: *Financial Accounting and junior standing.*

BA 314

Human Resource Management (3,0)
3 Credits

This course will examine the functions to be accomplished in effectively managing human resources. An in-depth study of the interrelationship of managers, organizational staff, and/or specialists will assist the student in understanding and applying management theories to real-world human resource planning. Areas of concentration include human resource planning; recruitment and selection; training and development; compensation and benefits; safety and health; and employee and labor relations.

Prerequisites: *Management and sophomore standing.*

Course Descriptions

BA 317

Organizational Behavior (3,0)

3 Credits

A basic course in the analysis of various behavioral concepts affecting human behavior in business organizations, with emphasis on research, theory, and practice.

Prerequisites: *Management and sophomore standing.*

BA 320

Business Information Systems (3,0)

3 Credits

A management approach to understanding business information systems. The general characteristics, potential, and limitations of business systems are covered. The major emphasis is on understanding the inputs, processing, and outputs of a variety of business systems; the ways in which business systems are interrelated and the inherent management problems involved in the implementation and control of such systems.

Prerequisites: *advanced computer skills and junior standing.*

BA 321

Aviation/Aerospace Systems Analysis Methods (3,0)

3 Credits

Overview of the system development life cycle. Emphasis on current system documentation through the use of both classical and structured tools/techniques for describing process flows, data flows, data structures, file designs, input and output designs, and program specifications.

Prerequisite: *advanced computer skills.*

BA 322

Aviation Insurance (3,0)

3 Credits

An introduction to the basic principles of insurance and risk with its special application to the aviation industry. An in-depth review of the aviation insurance industry in the U.S. including the market and types of aviation insurers.

Prerequisite: *sophomore standing.*

BA 324

Aviation Labor Relations (3,0)

3 Credits

An investigation of labor-management relations in the aviation industry. Examined are the history of unionism, structure of unions, legal environment and the Railway Labor Act, collective bargaining, public sector relationships, grievance procedures, and conflict resolution.

Prerequisite: *sophomore standing.*

BA 325

Social Responsibility and Ethics in Management (3,0)

3 Credits

A comprehensive inquiry into the major components of social responsibility including economic, legal, political, ethical, and societal issues involving the interaction of business, government, and society.

Prerequisites: *Management and sophomore standing.*

BA 331

Transportation Principles (3,0)

3 Credits

Basic principles of the several modes of transportation: air, sea, rail, highway, and pipeline including problems of competition, the importance of each in the economy, and future developmental prospects.

Prerequisite: *sophomore standing.*

BA 332

Corporate Finance I (3,0)

3 Credits

The finance function as used by management, including financial analysis and control financial planning; and short, intermediate, and long-term financing, using the theory of cost of capital and leverage in planning financial strategies. Aviation-related businesses are emphasized.

Prerequisites: *Financial Accounting and junior standing.*

BA 333

Personal Financial Planning (3,0)

3 Credits

A study of the personal financial planning process. Includes taxes, investments, purchase of housing/auto, insurance needs and analysis, use of credit, and retirement and estate planning. Student will develop a personal financial plan and will invest in a $500,000 portfolio of securities.

Prerequisite: *junior standing.*

BA 335

International Business (3,0)
3 Credits

An analysis of economic development and international trade in modern times, with an examination of current U.S. relations with other nations. Attention will be focused on the impact of foreign trade on the aviation industry and the industry's contribution to economic development.

Prerequisite: *sophomore standing.*

BA 340

International Accounting (3,0)
3 Credits

This course introduces the student to accounting in the global environment The student will learn about accounting systems and reporting practices around the world. Efforts toward accounting harmonization and the impact of International Financial Reporting Standards will be discussed. Specific accounting topics, such as accounting for currency exchange rate changes, financial reporting and disclosure issues in a global context, and using financial statements across borders and in emerging capital markets will be covered. Managerial issues in an international context will also be discussed.

Prerequisites: *Financial Accounting and junior standing.*

BA 390

Business Law (3,0)
3 Credits

A survey of the legal aspects of business transactions. Areas covered include contracts, agency, bailment, negotiable instruments, partnerships, corporations, consumer credit, and the government's influence on business law.

Prerequisite: *sophomore standing.*

BA 400

Investment Analysis (3,0)
3 Credits

This course is an introduction to the field of investments. The course is designed as a guide for people studying the capital markets for the first time. The course provides a survey of investments including security markets, investment vehicles, investment analysis, and portfolio management. Specific topics include the concept of risk and return, types of financial instruments, study of how they are bought and sold, an introduction to allocation for individuals, concept of efficient markets, equity and bond portfolio management, and portfolio performance evaluation. The course is taught from the viewpoint of an individual rather than an institutional investor. The course uses current economic and capital market information to make practical application of the course materials.

Prerequisites: *BA 332 and senior standing.*

BA 405

General Aviation Marketing (3,0)
3 Credits

Marketing and management concepts applicable to FBOs and other general aviation enterprises. Travel analysis is performed to determine the need for a business aircraft.

Prerequisite: *junior standing.*

BA 406

Strategic Management of Technical Operations (3,0)
3 Credits

This course presents an advanced study of strategic management theory, technical management, and the management of technology in a global aviation industry. Detailed coverage of the aviation technical management field is provided as well as that of the working aviation environment and system integration where the effective management of research, design, production, technical sales, and services functions are employed.

Prerequisite: *graduating senior standing.*

BA 408

Airport Management (3,0)
3 Credits

An examination of the management of airports with an emphasis on the facilities that make up an airport system, including airspace, airfield, and terminal and ground access operations.

Prerequisites: *Management and junior standing.*

BA 410

Management of Air Cargo (3,0)
3 Credits

Intensive study of the practices and problems of management with respect to air cargo. Importance of air cargo service to the economy, rate and tariff problems, terminal facilities, competition, and future prospects.

Prerequisite: *junior standing.*

Course Descriptions

BA 411

Logistics Management for Aviation/Aerospace (3,0)
3 Credits

This course examines ways to optimize the physical flow of goods and materials in a firm from acquisition through production, and movement through channels of distribution. It focuses on applying logistics theory to aviation management problems in materials handling, managing inventory, planning capacities, and locating distribution centers. It includes case studies with aviation/aerospace applications using computer models.

Prerequisite: *junior standing.*

BA 412

Airport Planning and Design Standards (3,0)
3 Credits

The principles of airport master planning and system planning are studied. Fundamental principles of airport layout and design are covered, including geometric design, airport drainage, pavement design, passenger and cargo terminal layout, and capacity and delay effects.

Prerequisites: *Airport Management and senior standing.*

BA 415

Airline Management (3,0)
3 Credits

An introduction to the administrative aspects of airline operation and management. Topics include the annual profit plan, uniform system of accounts and reports, demand analysis, scheduling, the theory of pricing, fleet planning, facilities planning, and airline financing.

Prerequisites: *Management and junior standing.*

BA 418

Airport Administration and Finance (3,0)
3 Credits

An advanced study of the organizational, political, and financial administration of public and private civil use airports. Areas of emphasis include public relations management, safety and security issues, employee organizational structures, financial and accounting strategies, revenue and expense sources, economic impacts of airport operations, airport performance measurement standards, and current trends and issues of direct concern to airport administrators.

Prerequisites: *Airport Management and senior standing.*

BA 419

Aviation Maintenance Management (3,0)
3 Credits

Comprehensive examination of organizational maintenance policies, programs, and procedures. Emphasis on maintenance planning; forecasting and cost control; reliability and safety and flight schedule performance.

Prerequisites: *Statistics and junior standing.*

BA 420

Management of Production and Operations (3,0)
3 Credits

An intensive study of management in all organizations: service oriented and product oriented. Scheduling, inventory control procurement, quality control, and safety are investigated. Particular attention is given to applications of aviation-oriented activities.

Prerequisites: *Statistics and senior standing.*

BA 421

Small Business Management (3,0)
3 Credits

An analysis of the theoretical and practical knowledge necessary to be successful in conceiving, initiating, organizing, and operating a small business. Special focus will be placed on small businesses in the aviation field.

Prerequisites: *Financial Accounting and senior standing.*

BA 422

Life Cycle Analysis for Systems and Programs in Aviation/Aerospace (3,0)
3 Credits

This course is a study of system theory and its relationship to aviation/aerospace systems management. It covers a brief history of system theory and system life cycle, and presents the major activities in each phase of a system's life cycle. Also covered are specific topics related to system design and support, including reliability, maintainability, availability, testing, quality control, customer support, product improvement program analysis, and the role of data collection and analysis in the operational phase. Related topics covered are cost-effectiveness analysis and project management. The course examines applications and case studies specific to aviation/aerospace, including military applications and computer simulation models.

Prerequisite: senior standing.

BA 424

Project Management in Aviation Operations (3,0)
3 Credits

This course introduces the student to the concept of project management in aviation operations. It addresses the three-dimensional goals of every project: the accomplishment of work in accordance with budget, schedule, and performance requirements. The procedures for planning, managing, and developing projects in an aeronautical environment are covered as well as the aspects of controlling project configuration from inception to completion. Automated tools used to determine cost, schedule, staffing, and resource allocation are covered as well as the process of determining the effectiveness and technical validity of aviation-related projects.

Prerequisites: *computer skills and senior standing.*

BA 425

Trends and Current Problems in Air Transportation (3,0)
3 Credits

Analysis of selected contemporary issues, problems, and trends facing management in various segments of the aviation industry including general aviation and the airlines. Students apply previously learned concepts to practical problems to develop increased understanding and demonstrate knowledge of the subject.

Prerequisites: *Management and senior standing.*

BA 426

International Aviation Management (3,0)
3 Credits

An investigation of international aviation management and its three elements: the nature of international aviation business, working in a foreign environment, and managing in an international environment.

Prerequisites: *International Business and senior standing.*

BA 427

Management of the Multicultural Workforce (3,0)
3 Credits

An investigation into the management of the multicultural workforce. The elements of cultural anthropology and international business, communicating across cultures, contrasting cultural values, and managing and maintaining organizational culture are addressed in the context of international aviation management.

Prerequisites: *Management and junior standing.*

BA 430

International Trade and Regulations (3,0)
3 Credits

Economic analysis of international trade, capital flows, and labor migration with particular emphasis on the laws governing these factors. Aviation applications include code-sharing and other international airline agreements, the impact of trade subsidies and open skies treaties.

Prerequisites: *Economics, Business Law, and junior standing.*

BA 434

Corporate Finance II (3,0)
3 Credits

The objective of this course is to study the major decision-making areas of managerial finance and some selected topics in financial theory. The course reviews the theory and empirical evidence related to the investment and financing policies of the firm and attempts to develop decision-making ability in these areas. This course serves as a complement and supplement to Corporate Finance I. Topics include leasing, dividend policy, mergers and acquisitions, corporate reorganizations, financial planning, working capital management, and international finance. Aviation and aerospace related businesses are emphasized.

Prerequisites: *Corporate Finance I and junior standing, or permission of the instructor.*

BA 436

Strategic Management (3,0)
3 Credits

This business capstone course examines strategic management principles involving strategy, formulation, implementation, evaluation, and organization analysis. Case analysis employing strategic management principles is used to examine and solve organization problems. Total quality management concepts are studied for improvement of organizational effectiveness.

Prerequisite: *graduating senior standing.*

BA 449

Strategic Marketing Management (3,0)
3 Credits

This capstone marketing course focuses on strategic analysis and planning by aviation marketing managers. Emphasis will be given to corporate and marketing strategy, market analysis and targeting, strategic marketing programming, and market control.

Prerequisites: *Marketing and senior standing.*

Course Descriptions

BA 450

Airline/Airport Marketing (3,0)
3 Credits

An investigation of the role of marketing in the aviation/airport industries. Topics to be covered include consumer segmentation, database management, integrated marketing communications, public relations, vendor relations, and retailing.

Prerequisites: *Marketing and senior standing.*

BA 299, 399, 499

Special Topics in Management
1-4 Credits

Individual independent or directed studies of selected topics in management.

Prerequisites: *consent of the instructor and approval of the department chair. May be repeated with change of content.*

Cooperative Education

CE 396, 397, 398

1-6 Credits

Aerospace Engineering (AE), Aerospace Studies (AR), Aeronautical Science (AS), Aircraft Engineering Technology (ET), Aviation Business Administration (ABA), Management of Technical Operations (MTO), Aviation Management (AM), Avionics (AV), Computer Engineering (CEC), Computer Science (CS), Electrical Engineering (EE), Flight (FL), Global Security and Intelligence Studies (GSIS), Maintenance Technology (MT), Space Studies (SP), Science, Technology, and Globalization (STG). Provides practical learning experience in full-time or part-time employment related to the student's degree program and career goals. Course title and level are based on the work assignment.

Prerequisite: *approval by the department chair and cooperative education administrator.*

NOTE: Cooperative Education and internship experiences are designed as academically based experiential education. A student enrolled in a university-approved co-op/internship professional activity and registered for 6 credit hours will be considered full-time by all university departments other than Financial Aid. The Financial Aid Office will consider a 6 hour co-op/internship as half-time enrollment and will process financial aid accordingly. They will report enrollment to the outside agencies as half-time, thus keeping them out of repayment on their student loans.

CE 496, 497, 498

1-6 Credits

Continuation of CE 396, 397.

Computer Engineering

CEC 220

Digital Circuit Design (3,0)
3 Credits

Introduction to logic design and interfacing digital circuits. Boolean algebra, combinatorial logic circuits, digital multiplexers, circuit minimization techniques, flip-flop storage elements, shift registers, counting devices, and sequential logic circuits. Corequisite: CEC 222.

CEC 222

Digital Circuit Laboratory (0,3)
1 Credit

Laboratory experiments in the measurement and verification of digital circuits. Discrete and integrated logic circuit design analysis and measurements. Corequisite: CEC 220.

CEC 300

Computing in Aerospace and Aviation (3,0)
3 Credits

This course explores the computer engineering aspects of systems ranging from embedded sensor and actuator controllers to high-performance computing systems used in air traffic control and weather forecasting. The critical factors that impact the engineering decisions involved, including technological, economic, social, and professional issues, are discussed. Key engineering techniques and practices, including database, human-computer interaction, and networks of systems, are explored through case studies and representative examples from the aerospace and aviation domains.

Prerequisites: *EGR 115 and junior standing.*

CEC 315

Signals and Systems (3,0)
3 Credits

Introduction to signal processing systems for both digital and analog systems. Mathematics of signal representation and signal processing, including functional descriptions of signals and of systems. Implications of linearity and time-invariance, and input-output behavior of linear, time-invariant systems. Causality and stability. Zero-input and zerostate responses. Z and Laplace Transforms. Fourier Series and Fourier Transforms for discrete and continuous systems. Extensive use of MATLAB and Simulink.

Prerequisite: *EGR 115. Corequisite: MA 345.*

CEC 320

Microprocessor Systems (3,0)
3 Credits

Study of digital computer organizations. Introduction to microcomputer systems using a current microprocessor. Assembly language programming techniques for microcomputers will be used to study digital computer operation. Input and output techniques, memory devices, RS 232, and other interfacing techniques will be studied. Hardware and software relationships will also be discussed.

Prerequisites: *CEC 220 and experience in programming in a high-level language. Corequisite: CEC 322.*

CEC 322

Microprocessor Systems Laboratory (0,3)
1 Credit

Hands-on experience with a microprocessor is provided through weekly experiments involving hardware and software techniques. Corequisite: CEC 320.

CEC 330

Digital Systems Design with Aerospace Applications (3,3)
4 Credits

This is the continuation of Introduction to Digital Circuit Design (CEC 220). Students in this class use tools such as FPGA (field programmable gate array) to design and implement digital circuit components and subsystems that are responsible for the control and operation of an aerospace system. In addition, students will be introduced to high-level design languages, such as VHDL (VHSIC hardware description language), RTL (register transfer language), and their application to the design and development of digital circuits.

Prerequisites: *CEC 220 and CEC 222.*

CEC 410

Digital Signal Processing (3,0)
3 Credits

Specification, design, and implementation of offline signal processing systems on general-purpose computers and real-time signal processing systems on special-purpose digital signal processing microprocessors (DSPs). Review of sampling theory and discrete-time filtering. Filter design tools. Digital-to-analog and analog-to-digital conversion hardware. DSP core architectures and hardware interrupts. Aspects of system-on-a-chip DSPs for data transfer, cache management, external memory reference, and co-processor interface. Real-time operating systems for DSPs. Applications to modern communication and control systems.

Prerequisite: *CEC 315. Corequisite: CEC 411.*

CEC 411

Digital Signal Processing Laboratory (0,3)
1 Credit

Laboratory companion course to CEC 410 featuring development of signal generation, processing, and analysis systems using digital signal processing microprocessors (DSPs). DSP software development and debugging environments. Chip- and board-support libraries. Use of algorithm libraries for rapid system development. System development tools, including automatic code generation with Simulink. Culminates in development of stand-alone board-based DSP system. Corequisite: CEC 410.

CEC 420

Computer Systems Design I (2,3)
3 Credits

This course introduces students to discussing issues of management, planning, task assignment, resource allocation, requirement collection, and system specification and design. The team working in a distributed environment will develop a base for implementation of a computer-centered system with elements of both hardware and software.

Prerequisites: *Computer Engineering major, senior status.*

CEC 421

Computer Systems Design II (1,6)
3 Credits

This course continues with project development, focusing on issues of detailed design, modularization, component selection, coding, assembling, and testing. The team working in a distributed environment will implement and test a computer-centered system with elements of both hardware and software.

Prerequisite: *EE 420 (Prerequisite for Prescott campus only).*

Course Descriptions

CEC 440

Autonomous Vehicle Design (3,0)
3 Credits

This course introduces students to the issues involved in the development of autonomous vehicles as applied in aerospace and aviation. This multidisciplinary course is designed to give students a variety of basic concepts and hands-on experience in robotics and automation. Topics include control, sensing, vision, intelligence, and mechanics. To gain hands-on experience, students will participate in a project in which they will design and build an autonomous vehicle that will participate in an international robotics competition.

Prerequisite: *CEC 320.*

CEC 450

Real-Time Systems (3,0)
3 Credits

The course introduces the concepts of real-time systems from the user and designer viewpoint. The requirements, design, implementation, and basic properties of real-time application software are described with an overview of system software. Related topics such as interrupts, concurrent task synchronization, sharing resources, and software reliability are discussed. A team project on a real-time prototype application may be incorporated in the course.

Prerequisites: *CS 225, CEC 320. Corequisite: CS 420*

CEC 460

Telecommunications Systems (3,0)
3 Credits

Techniques and applications in telecommunications. Types of data communication versus line discipline methodology. Hardware requirements and constraints. Speed versus quality. Security and encoding algorithms.

Prerequisite: *CEC 320 or permission of instructor.*

CEC 470

Computer Architecture (3,0)
3 Credits

This course describes in detail the Von Neuman computer architecture which includes processors, memory, input/ output, and transfer of information; examples of machine language, assembly language, microprogramming and operating system will be discussed. Additional topics in advanced computer architecture and computer systems will be covered.

Prerequisite: *CEC 320.*

CEC 299, 399, 499

Special Topics in Computer Engineering
1-6 Credits

Directed studies of selected topics in computer engineering.

Prerequisite: *consent of instructor and department chair.*

Civil Engineering

CIV 140

Engineering Measurements with Laboratory (1,3)
2 Credits

Introduction to data collection and analysis. Principles of surveying and mapping, with emphasis on modern methods. Laboratory methods.

CIV 304

Structural Analysis (3,0)
3 Credits

Analysis of statically determinate and indeterminate structures using statics, kinematics, virtual work, strain energy, force, and displacement methods. Structural laboratory testing.

Prerequisite: *ES 202.*

CIV 307

Civil Engineering Materials I (3,3)
4 Credits

Properties of engineering materials: steel, concrete, soil, asphalt, polymers, composites. Relationship between structure and behavior. Standard methods of testing and inspecting. Laboratory methods.

CIV 311

Introduction to Transportation Engineering (3,0)
3 Credits

Fundamentals of transportation engineering including planning, design, construction, maintenance, operation, economics, and the role of transportation facilities in society. Concepts, underlying theory, and design issues are detailed.

CIV 316

Hydraulics (3,0)
3 Credits

Open channel and pipe flows. Hydraulic structures. Groundwater hydrology and stormwater management.

CIV 320

Soil Mechanics (3,3)
4 Credits

Study of the engineering behavior of soil: origin, classification, identification, and structure. Permeability, seepage, consolidation, settlement, slope stability, lateral pressures, bearing capacity. Soil sampling and testing. Laboratory methods.

CIV 330

Computer Applications in Transportation (1,3)
2 Credits

Application of computer software for planning and design of transportation systems. Emphasis is placed on finding solutions to current problems associated with existing airport and intermodal transportation systems.

Prerequisite: *CIV 311.*

CIV 340

Construction Engineering (3,0)
3 Credits

Delivery of construction projects. Introduction to construction equipment, production rates, construction methods for concrete, asphalt, steel, wood, and masonry, planning and scheduling, safety, and construction economics.

CIV 362

Engineering and Construction Operations in Space (3,0)
3 Credits

U.S. space exploration policies in the 21st century. Construction in zero- or low-weight environments. Development of lunar and planetary resources. Controlled ecological life support systems. Lunar concrete.

CIV 370

Computational Methods in Civil Engineering (3,0)
3 Credits

Numerical techniques for solving civil engineering problems. Applications of statistical methods. Matrix operations. Spreadsheet development.

Prerequisite: *CS 223.*

CIV 421

Geotechnical and Foundation Engineering (3,0)
3 Credits

Prediction of settlement, analysis of the stability of slopes, prediction of the bearing capacity of shallow and deep foundations, and determination of earth pressures acting on retaining structures.

Prerequisite: *CIV 320.*

CIV 422

Design of Pavement Structures (3,0)
3 Credits

Theory and practice in pavement design for highways and airfields, pavement performance, structural design of pavement layers, types of materials used in pavement layers, characterization of pavement layer materials, introduction to pavement management concepts.

Prerequisite: *CIV 320.*

CIV 424

Rehabilitation of Pavement Structures (3,0)
3 Credits

Pavement distresses and their causes. Pavement evaluation, roughness, friction, drainage survey and evaluation, structural evaluation, material characterization, traffic loading evaluation, design of pavement rehabilitation alternatives, economic analysis, and selection of preferred alternatives.

Prerequisite: *CIV 320.*

CIV 431

Reinforced Concrete Design (3,0)
3 Credits

Properties of concrete, its constituents, and reinforcement steels. Design of beams, columns, beam-columns, and slabs. Cracking and deterioration. Torsion and shear reinforcement. Anchorage and bond detailing. Application of the concrete design code.

Prerequisite: *CIV 304.*

CIV 432

Structural Steel Design (3,0)
3 Credits

Steel and its properties. Design of tension members, column members, torsional members, plate girders. Welded and bolted connections. Steel design specifications and building codes. Current philosophies in steel design.

Prerequisite: *CIV 304.*

Course Descriptions

CIV 441

Civil Engineering Materials II (3,1)

4 Credits

Physical and mechanical properties of construction materials, portland cement concrete, proportioning of concrete mixtures including admixtures. Fiber reinforced concrete design and evaluation. Origin, production, specifications, and tests of bituminous materials and paving mixtures used in construction and maintenance of roads and pavements, pavement surface properties, pavement distress, and correction alternatives.

Prerequisite: *CIV 307.*

CIV 447

Airport Design I (3,0)

3 Credits

Fundamental principles of airport layout and preliminary design. Airport site selection, runway length and orientation, air traffic control, capacity, and delay.

Prerequisite: *CIV 311.*

CIV 457

Airport Design II (3,0)

3 Credits

Airport terminal passenger and vehicle processing systems. Lighting and signing systems, pavement marking, baggage handling, communication systems, and security systems.

Prerequisite: *CIV 447.*

CIV 460

Senior Design Project (3,0)

3 Credits

Detailed and complete design of a civil engineering facility. Progress reports and presentation. Interdisciplinary group cooperation is emphasized.

Prerequisite: *senior standing.*

CIV 490

The Civil Engineering Profession (1,0)

1 Credit

Current problems in engineering, professional duties and responsibilities, opportunities for professional development, ethics, and professionalism.

Prerequisite: *graduating senior status.*

CIV 499

Directed Design Project (Variable)

1-3 Credits

Directed design project. Individual investigation of current design problem. Offered by special arrangement only.

Prerequisite: *permission of Civil Engineering program coordinator.*

CIV 199, 299, 399

Special Topics in Civil Engineering (Variable)

1-3 Credits

Directed studies of special topics in Civil Engineering. Offered by arrangement only.

Prerequisite: *consent of instructor and Civil Engineering program coordinator.*

Communication

COM 008

Academic English for Non-Native Speakers of English (4,0)

4 Credits

A developmental course designed to help intermediate-level non-native speakers of English develop their English language proficiency. The emphasis is on writing and reading in academic settings. Students cannot withdraw from the course. The course must be passed with a grade of C or better. (Credit not applicable to any degree.)

COM 018

Advanced Academic English for Non-Native Speakers of English (4,0)

4 Credits

A developmental course designed to help advanced-level non-native speakers of English develop their English language proficiency. The emphasis is on writing and reading in an academic setting and on preparation for degree-credit bearing communication courses. (Credit not applicable to any degree.) Students cannot withdraw from the course. The course must be passed with a grade of C or better.

Prerequisite: *HU 008 or ESL Placement Test.*

COM 020

Fundamentals of Communication (4,0)

4 Credits

Designed to improve the student's reading and writing abilities through focusing on critical thinking.

All three skills are approached as facets of each other and as processes that the student learns to control and take responsibility for. The fundamentals of grammar, punctuation, and sentence structure are strengthened when students write and revise multiparagraph expository essays. A grade of C is required to pass this course, and it may not be dropped. (Credit is not applicable to any degree.)

COM 122

English Composition and Literature (3,0)

3 Credits

This course focuses on principles of writing in response to readings in the humanities, social sciences, and other interdisciplinary fields. Students develop their communicative, evaluative, critical thinking, and research writing abilities through the close examination of key texts across those disciplines.

Prerequisite: *satisfactory completion of basic skills requirements.*

COM 219

Speech (3,0)

3 Credits

A continuation of the study of communication and communication theory with emphasis on overcoming communication apprehension, developing listening skills, mastering oral performance, and writing about communication. Individual sections may focus on public speaking, group discussion, oral interpretation, or interpersonal communication. Section emphasis varies by instructor and is listed in the Schedule of Courses.

Prerequisite: *COM 122.*

COM 221

Technical Report Writing (3,0)

3 Credits

Preparation of formal and informal technical reports, abstracts, resumes, and business correspondence. Major emphasis placed on the long technical paper and the acquisition of advanced writing skills.

Prerequisite: *Any course from the HU 140 series.*

COM 222

Business Communication (3,0)

3 Credits

An introduction to effective business communication. Topics in oral, written, nonverbal, and intercultural communication are covered. Research methods, effective speaking, and the preparation of letters, memoranda, and reports are emphasized.

Prerequisite: *Any course from the HU 140 series.*

COM 225

Science and Technology Communication (3,0)

3 Credits

This course introduces the practices of communicating news and issues in science and technology to a variety of publics through magazine-style writing and public speaking. Guest speakers will present research questions, methodologies, and issues within the sciences. Coursework also includes readings from successful science and technology communicators, illustrating various solutions to writing about complex subjects. Special topics include identifying science and technological stories, evaluating sources and information, and communicating findings clearly, comprehensibly, and accurately for publication and speaking engagements.

Prerequisite: *COM 221.*

COM 260

Introduction to Media (3,0)

3 Credits

The structure of, professional opportunities in, and social issues arising from media industries. Required of all Communication students. Must be taken within the first year of entering the program.

Prerequisite: *COM 122.*

COM 265

Introduction to News Writing (3,0)

3 Credits

COM 265 offers Communication majors theory and practice in the fundamentals of various journalistic genres: news reporting, features, interviews, spot news, page layout, interpretive journalism, and more. This course introduces students to use of the AP Stylebook, libel law, and ethical issues in journalism.

Prerequisite: *COM 122 or permission of instructor.*

COM 320

Mass Communication Law and Ethics (3,0)

3 Credits

This course is based on case studies introducing students to the legal and ethical environments underpinning First Amendment rights in the United States from the nation's founding to the present. Topics in law include intents of the framers, prior restraint, libel, privacy, hate speech, freedom of information laws, shield laws, and copyright. Topics in ethics concentrate on models for decision-making in difficult situations. Practices of journalists, media rela-

Course Descriptions

tions practitioners, and Internet communicators will be examined. Topics in ethics concentrate on models for decision-making in difficult situations.

Prerequisite: *COM 221.*

COM 322

Aviation and Aerospace Communication (3,0)
3 Credits

This course introduces the practices of communicating news and issues in aviation and aerospace to a variety of publics through magazine-style writing and public speaking. Students will learn how to recognize the news value of contemporary aviation issues, to gain an understanding of those issues through research and interviews with experts, and to write about and discuss the issues. Coursework also includes readings from respected aviation writers that illustrate aviation's economic and social impact on society. Special topics include safety, airport security and congestion, emerging legal issues, and international aviation trends.

Prerequisite: *COM 221.*

COM 350

Environmental Communication (3,0)
3 Credits

This course centers on national and regional environmental issues, including planning, regulation, and crises. Topics include responses to climate change, endangered species, wetlands preservation, coastal development and hazardous materials regulation. Field trips and guest speakers will be included. Students learn how to research and write articles and stories for nature and environmental magazines as well as general-audience media.

Prerequisite: *COM 221 or COM 225.*

COM 351

Journalism (3,0)
3 Credits

Theory and practice of the techniques of journalism, familiarizing the student with the functions, skills, and responsibilities required in writing, editing, and producing news and technical publications.

Prerequisite: *Any course from the HU 140 series.*

COM 360

Media Relations I (3,0)
3 Credits

The course focuses on different theories of persuasive communication and the construction of persuasive messages. Individual instructors may explore persuasive communication in public service and political campaigns, interpersonal communication, social movements, persuasive writing, or advertising. Students are evaluated on their ability to recognize, apply, and evaluate the communication theories used to design persuasive messages.

Prerequisite: *COM 219.*

COM 364

Visual Design (3,0)
3 Credits

This course presents principles of visual design applying to print and electronic publications, including unity, emphasis, balance, line, shape, value, color, and texture. Special topics include ethics, typography, semiotics, and layout. Students analyze existing graphical artifacts and create print and electronic projects focused on communicating science and technology, using professional design software.

Prerequisites: *COM 221, COM 222, or an equivalent professional writing course; COM 265.*

COM 410

Advanced Professional Writing (3,0)
3 Credits

A sophisticated process approach to strategies for effective communication in the workplace. Balancing theory and practice in professional communication, students will work singly and in collaborative teams to integrate visuals, layout and design, editing and review systems, online documentation, and electronic publishing. All assignments carry written components with equal emphasis placed on oral execution.

Prerequisites: *COM 219, COM 221, COM 265.*

COM 411

Web Design Workshop (3,0)
3 Credits

In addition to highlighting theories of communication related to design and content, this course serves as a practical workshop in Web site development, with an emphasis on communicating science and technology in a professional context. In close consultation with the professor, students design and produce Web sites for university programs, departments, non-profit organizations, and businesses. Experience with Web development software is recommended.

Prerequisites: *COM 221, COM 222, or an equivalent professional writing course.*

COM 412

Advanced Technical Writing (3,0)

3 Credits

Communication specific to the technical communication profession is studied, and students prepare at least one formal project suitable for inclusion in a career portfolio. The projects may include, but are not limited to, the following: technical manual, grant or business proposal, product development and documentation, multimedia training or product presentation, training modules, and corporate reports. Projects may be in paper, electronic, or combination of multimedia formats, depending on trends in the profession and use of technology. Professional technical communicators may serve as mentors or speakers.

Prerequisite: *COM 221.*

COM 415

Non-Verbal Communication (3,0)

3 Credits

This course entails the study of communication behaviors and processes not involving the expression of written or spoken words, which contribute information to a message. Special attention is directed to the study of voice qualities; facial expression and body language; space, personal distance, and touch; the use of time and objects; and personal appearance. Study also involves non-verbal communication in applied settings, as well as research strategies for observing, measuring, and understanding non-verbal phenomena.

Prerequisites: *COM 219, equivalent Speech Communications course. (Also offered as HU 415. Students receive either Communication or Humanities credit, but not both.)*

COM 440

Senior Employment Practicum (1,0)

1 Credit

Open only to Communication majors. Preparation and evaluation of resumes, employment correspondence, portfolios, and mock employment interviews. Must be taken the semester after completing 88 hours.

Prerequisite: *COM 265.*

COM 460

Media Relations II (3,0)

3 Credits

Mastery of writing and speaking genres in media relations with an emphasis on crisis communication.

Prerequisites: *COM 265, COM 360.*

Computer Science

CS 101

Introduction to Keyboard Operations (1,0)

1 Credit

Fundamental skills and techniques in the operation of the keyboard and the use of computers in word processing. Emphasis is placed on the fundamentals of word processing and the development of touch typing with speed and accuracy.

CS 111

Spreadsheet (1,0)

1 Credit

An understanding of spreadsheet applications and commands designed to develop an intermediate level of spreadsheet competency. An exploration of practical spreadsheet applications such as budgets, income taxes, profit and loss statements, calculating grades, among many others. Specific commands include creating, editing, saving, retrieving, and printing spreadsheets; using statistical data and financial functions; depicting spreadsheet; information graphically in bar graphs, pie charts, and line graphs; linking and integrating spreadsheets, and using spreadsheet macros.

Prerequisite: *IT 109 or equivalent knowledge.*

CS 114

Presentation Graphics (1,0)

1 Credit

An overview of business graphics. Emphasis is on the design and creation of professional graphics such as charts and short documents to be used to clarify information in oral and written presentations. Specific topics include planning and organizing charts and presentation documents; creating pie charts, bar charts, line charts, and presentation documents; formatting, editing, and printing; using text, symbols, and graphics; importing artwork and creating an automated presentation of charts and documents.

CS 116

Recent Trends in Application Software (1,0)

1 Credit

The content of the course is left to the specific needs of the student and new software.

Prerequisite: *IT 109 or equivalent knowledge.*

Course Descriptions

CS 117

Computer Configurations (3,0)
3 Credits

Provides the student with an in-depth understanding of the technical aspects of hardware and software and a study of the current trends in computing. The course will include hardware and software installations, troubleshooting, and a survey of resources in personal computing.

CS 118

Fundamentals of Computer Programming (3,0)
3 Credits

Introduction to basic concepts of structured programming with applications in business, technology, and engineering. This course is intended for the student with little or no experience in programming.

CS 125

Computer Science I (3,3)
4 Credits

Introduction to problem-solving methods, algorithm development, and software engineering; software development process, program design, coding, review, testing, and documentation; and programming using a modern programming language that supports modular development. The course has a closed laboratory that includes activities dealing with the computing environment, the software development process, and programming exercises.

Prerequisite: *experience in programming in a high-level language, and proficiency in high school pre-Calculus mathematics.*

CS 207

Network-Based Computing (3,0)
3 Credits

Local area network installation and operations. Topics covered include but are not limited to LAN, WAN, terminology, protocols, topologies, mail systems, network administration functions, and hardware.

Prerequisites: CS 117 and CS 118.

CS 210

Scientific Programming (3,0)
3 Credits

Introduction to problem-solving methods, algorithm development, program design, coding, debugging, testing, use of subprograms and documentation, and programming in a block-structured high-level language covering control structures and simple data structures such as arrays and files. This course emphasizes scientific/engineering programming techniques and applications. Corequisite: MA 112 or MA 241.

CS 222

Introduction to Discrete Structures (3,0)
3 Credits

An introduction to the fundamental algebraic, logical, and combinatorial concepts of mathematics that provide a foundation for the study of computer science.

Prerequisites: *experience in programming in a high-level language, pre-Calculus mathematics.*

CS 223

Scientific Programming in C (3,0)
3 Credits

This is a course in C programming for scientists and engineers. Using a problem-solving approach for developing algorithms, the algorithms are implemented in C and include the following topics: data types and related operations, input/output, control structures, functions, array, files, and strings.

Prerequisite: *MA 112 or MA 241 or permission of instructor.*

CS 225

Computer Science II (3,3)
4 Credits

This course emphasizes program design, style, data abstraction, information hiding, and testing; advanced programming features; and introduction to object-oriented concepts, basics of algorithm analysis, exception handling, string processing, recursion, pointers, and simple data structures. The course has a closed laboratory that includes activities dealing with the computing environment, the software development process, and programming exercises.

Prerequisite: *CS 125 or EGR 115.*

CS 235

Assembly Language Programming (3,0)
3 Credits

Introduction to computer architecture; assembler concepts and instruction format; addressing techniques; interrupt processing, especially input/output; segmentation, linkage, and external procedures; programming projects to develop understanding of assembly language concepts.

Prerequisites: *CS 220, CS 225.*

CS 308

Practicum (3,0)
3 Credits

This capstone project course is individualized to each student and uses most facets of their prior instruction.

Prerequisite: *all other courses required in the computer applications minor.*

CS 315

Data Structures and Analysis of Algorithms (3,0)
3 Credits

This course emphasizes the design, implementation, and analysis of algorithms dealing with searching, sorting, graphs, trees, and disk files.

Prerequisites: *CS 222, CS 225.*

CS 317

Files and Database Systems (3,0)
3 Credits

Introduction to file and database systems. The course will cover the theory of database systems, various database models, and the design of a database system. Course homework will reflect real-life problems requiring cooperation, problem formulation, and problem-solving skills. A team/group term project may be assigned.

Prerequisites: *CS 222 and CS 225.*

CS 325

Programming in ADA (3,0)
3 Credits

Advanced systems concepts using the ADA language to implement software engineering, concurrent programming, and structured design techniques.

Prerequisites: *CS 210, CS 225, or permission of the instructor.*

CS 332

Organization of Programming Languages (3,0)
3 Credits

A comparative study of different programming paradigms. Students program in several languages chosen to illustrate the essential features of the paradigms studied. Formal language concepts are also introduced.

Prerequisites: *CS 222, CS 225.*

CS 335

Introduction to Computer Graphics (3,0)
3 Credits

Introduction to computer graphics, algorithms, graphics programming, graphics design, use of graphic packages, and applications of computer graphics to aviation, business, and scientific problems. A term project involving a graphics programming application may be assigned.

Prerequisites: *MA 241 and a proficiency in implementation language.*

CS 344

C Programming and UNIX (3,0)
3 Credits

This course is an advanced course in the C programming language and the UNIX programming environment and provides basic information about the general principles of operating systems. It begins with an introduction to the UNIX operating system, followed by an in-depth study of the C programming concepts and techniques in the UNIX environment. In addition, topics such as the function and structure of operating systems, process management, memory management, concurrency, UNIX system programming, and UNIX programming tools will be covered.

Prerequisite: *CS 225 or equivalent experience in programming.*

CS 350

Computer Modeling and Simulation (3,0)
3 Credits

Introduction to the basic aspects of modeling and simulation. Topics include statistical models, queuing theory, random variate generation, simulation languages, object-oriented programming, graphic output with animation, design and analysis of experiments, and verification and validation of simulation models. A term project involving the simulation of an element of aviation or aerospace may be assigned.

Prerequisites: *MA 222 or MA 412, a proficiency in computer programming, and junior/senior standing.*

CS 375

Algorithms (3,0)
3 Credits

This course covers strategies, mathematics, implementations, and performance properties of fundamental algorithms employed in computer science.

Prerequisites: *CS 315 and MA 242 or permission of instructor.*

Course Descriptions

CS 415

Human-Computer Interfaces (3,0)
3 Credits

This course introduces Computer Science students to several important aspects of how humans use computers and how software is designed for usability. Students are introduced to usability issues, graphical systems, and graphical interfaces.

Prerequisite: *SE 320 or permission of the instructor.*

CS 420

Operating Systems (3,0)
3 Credits

Development, structure, and functions of operating systems; demand service models; development of concurrent models.

Prerequisite: *CS 225 and junior standing.*

CS 425

Net-Centric Computing (3,0)
3 Credits

This course introduces Computer Science students and other engineering majors to areas of software and computer science that pertain to networks and network-based computation.

Prerequisites: *CEC 320 and CS 317 or permission of instructor.*

CS 445

Interfacing (3,1)
3 Credits

Introduction to microcomputers and microcontrollers, effect of the microprocessor on the system, memory, and microcomputer input/output methods. The subject of interface components and their characteristics, designing interface components, interfacing to standard buses and peripherals. Interface layout and construction. Interface software design and implementation.

Prerequisite: *CS 320 or equivalent.*

CS 455

Artificial Intelligence (3,0)
3 Credits

This course introduces students to the basic concepts of artificial intelligence with emphasis on knowledge engineering. Students gain experience, through individual and group exercises, in the various phases of system development: planning, requirements and specification, design, implementation, and testing. Students study and apply commercial tools to the development of knowledge-base systems in the aerospace and aviation domain.

Prerequisite: *CS 222 or permission of instructor.*

CS 299, 399, 499

Special Topics in Computer Science
1-6 Credits

Individual independent or directed studies of selected topics in computer science.

Prerequisites: *consent of the instructor and the department chair.*

Economics

Standing is based on credit hours earned toward the student's declared degree program.

EC 200

An Economic Survey (3,0)
3 Credits

An introduction to macro and microeconomic principles, problems, and policies with a view to current economic problems.

EC 210

Microeconomics (3,0)
3 Credits

An introduction to the economic principles of free enterprise supply and demand, private and social implications of profit maximization, market structure, and resource markets. Current microeconomic issues in aviation (such as liability reform, evolution of airline competition, etc.) are discussed.

EC 211

Macroeconomics (3,0)
3 Credits

An introductory analysis of employment, inflation, recession, GDP economic growth, and international trade with an emphasis on practical policy alternatives. Macroeconomic aviation applications such as the counter-cyclical growth of start-up airlines and consideration of ATC privatization are incorporated.

EC 225

Engineering Economics (3,0)
3 Credits

An introduction to microeconomic principles, problems, and policies as well as basic financial principles such as time value of money, capital budgeting, and cost of capital. The course will provide the engineering graduate with the tools needed for success in the workplace.

EC 310

Labor Economics (3,0)
3 Credits

A survey of the economics of the labor market to include wage determination and employment theory, labor organization, labor legislation, and current developments in labor relations.

Prerequisites: *Microeconomics and junior standing.*

EC 312

Money and Banking (3,0)
3 Credits

A preliminary investigation of the financial institutions of the U.S. and the relationship of monetary policy to income and price stabilization. Some analysis of international capital flows will also be undertaken.

Prerequisites: *Microeconomics and junior standing.*

EC 315

Managerial Economics (3,0)
3 Credits

An analytical approach to the manager's role in understanding pricing, costing, production, and forecasting. Concentrates on simple quantitative models to explain the firm's position in the market and how the manager can react to and control this information. Aviation topics commonly discussed include airport privatization and employee ownership of airlines.

Prerequisites: *Microeconomics and junior standing.*

EC 420

Economics of Air Transportation (3,0)
3 Credits

A study of the economic aspects of airline service with consideration given to the impact of federal aid and regulation, types of aircraft, airport problems, consumer interests, and competitive practices.

Prerequisites: *Microeconomics and junior standing.*

EC 299, 399, 499

Special Topics in Economics
1-4 Credits

Individual independent or directed studies of combinations of selected topics in economics.

Prerequisite: *consent of the instructor and the department chair.*

Electrical Engineering

EE 120

Introduction to Engineering Management (3,0)
1 Credit

Study of the tools engineers use to manage projects, programs, and research.

EE 200

Engineering Software Tools (3,0)
1 Credit

Study of software tools needed to solve engineering problems. Topics include but are not limited to the study of MATLAB, computer-aided design tools, and graphical simulation programs.

EE 220

Digital Circuit Design (3,0)
3 Credits

Introduction to logic design and interfacing digital circuits. Boolean algebra, combinatorial logic circuits, digital multiplexers, circuit minimization techniques, flip-flop storage elements, shift registers, counting devices, and sequential logic circuits.

EE 222

Digital Circuit Laboratory (0,3)
1 Credit

Laboratory experiments in the measurement and verification of digital circuits. Discrete and integrated logic circuit design analysis and measurements. Corequisite: EE 220.

EE 223

Linear Circuits Analysis I (3,0)
3 Credits

Volt-ampere characteristics for passive circuit elements, resistive network circuit theory, and simplification. Kirchoff's current and voltage laws. Introduction to linear network theorems and transformations. Transient response of RC, RL, and RLC circuits. Steady state and impedance circuit analysis for sinusoidal sources.

Prerequisite: *PS 250. Corequisite: MA 345.*

EE 224

Electrical Engineering Laboratory I (0,3)
1 Credit

Problem sessions, electrical instrumentation and measurement, verification of theory presented in EE 223, working knowledge of electronic test equipment. Corequisite: EE 223.

Course Descriptions

EE 300

Linear Circuit Analysis II (3,0)
3 Credits

Continuation of EE 223. Study of the Laplace and Fourier transforms, Fourier analysis, complex plane, resonance and coupled circuits, Bode Diagrams, and two-port networks.

Prerequisite: *EE 223. Corequisite: MA 441 or permission of instructor.*

EE 301

Electrical Engineering Laboratory II (0,3)
1 Credit

Problem sessions, analysis and simulation of analog and digital circuits using computer-aided design and analysis tools. Corequisite: EE 300.

EE 302

Electronic Devices and Circuits (3,0)
3 Credits

Introduction to basic semiconductor theory and semiconductor device characteristics. Diode and transistor models used in the analysis and design of electronic circuits. Basic amplifier circuits. Single and multi-stage amplifier analysis, design, and frequency response. Integrated circuit implementation of differential stages and operational amplifier circuits.

Prerequisite: *EE 223 or permission of the instructor. Corequisite: EE 304.*

EE 303

Signals and Filters (3,0)
3 Credits

Mathematics for filtering and spectral analysis of continuous and discrete systems. Solutions to filtering approximations via Butterworth, Chebyshev, elliptic, and others. Introductions to Z-transforms and digital filter design methods.

Prerequisites: *EE 300 and MA 441 or permission of instructor.*

EE 304

Electronic Circuits Laboratory (0,3)
1 Credit

Laboratory experiments in the measurement of electronic device characteristics. Design of biasing networks, small signal amplifiers, and switching circuits. Corequisite: EE 302.

EE 305

Electronic Devices and Circuits II (3,0)
3 Credits

Study of the characteristics of operational amplifiers. Design of op amp circuits used in a variety of electronic signal conditioning applications. Analysis and design of popular analog-to-digital and digital-to-analog circuits and their system application and limitations. Further study of basic components found in instrumentation systems, such as sensors, signal conditioning circuitry, power supplies, A/D and D/A circuitry, and other special electronic devices. Final design project requires the design of a simple data acquisition system.

Prerequisites: *EE 300, EE 302.*

EE 306

Introduction to Electrical Systems (2,0)
2 Credits

Direct Current electricity; circuits, resistance, DC machinery. AC current; transformers, three phase circuits, AC machinery, commercial applications, building codes.

EE 307

Avionics I (3,3)
4 Credits

Provides the first part of a comprehensive and rigorous study of avionics systems. A laboratory is provided to give the student the opportunity to gain hands-on experience. The course covers avionics systems from the basic physics of avionics to the latest technology.

Prerequisites: *EE 223, EE 224, MA 345, PS 250, PS 253.*

EE 308

Introduction to Electrical Communications (3,0)
3 Credits

This is an introductory course in communications and includes channels, networks, Shannon's law, random processes, modulation, and multiplexing. Transmitters and receivers are covered as an application of the theory introduced in this course. The Fourier transform is the major mathematical tool used in this course. The subjects are the basic foundation of both analog and digital communications, both wired and wireless.

EE 310

Avionics II (3,0)
3 Credits

Provides the second part of a comprehensive and rigorous study of avionics systems. This course includes practical laboratory examples. The course covers avionics systems from the basic physics of avionics to the latest technology. This course is a continuation of EE 307.

Prerequisite: *EE 307.*

EE 320

Microprocessor Systems (3,0)
3 Credits

Study of digital computer organizations. Introduction to microcomputer systems using a current microprocessor. Assembly language programming techniques for microcomputers will be used to study digital computer operation. Input and output techniques, memory devices, RS 232, and other interfacing techniques will be studied. Hardware and software relationships will also be discussed.

Prerequisites: *EE 220 and experience in programming in a high-level language.*

EE 322

Microprocessor Systems Laboratory (0,3)
1 Credit

Hands-on experience with a microcomputer is provided through weekly experiments involving hardware and software techniques. Corequisite: EE 320.

EE 325

Unmanned Aerial Vehicles (3,0)
3 Credits

This course provides the student with an overview of the engineering requirements for unmanned aerial vehicles. Included are the understanding of the mission requirements, such as surveillance, tactical, high altitude, long endurance, and armed. The basic fundamentals of machine control are reviewed and specific applications of those fundamentals to aerial vehicles. Methods of minimizing detection such as electromagnetic radiation, radar cross section, and acoustic noise generation. Particular attention is paid to design for reliability and security.

EE 330

Measurements for Medicine and Physical Sciences from Spacecraft and Aircraft (3,0)
3 Credits

This course covers the unique problems associated with making measurements from aircraft and spacecraft. This includes problems associated with moving platforms including mechanical accelerations, high electrical noise environment, and unattended measuring. For physiological measurements particular emphasis is placed on safety and problems associated with very low level signals. Modern computer-driven data acquisition methods are discussed.

EE 335

Electrical Engineering I (2,0)
2 Credits

Introduction of the fundamentals of electrical engineering. Circuit theory and variables. Voltage-current relationship for passive elements. Circuit analysis and network solutions. Phasors and frequency-domain analysis. Transient analysis of first and second order systems. Equivalent circuits and power. The Electrical Engineering Lab, EE 336, must be taken during the same semester as EE 335

Prerequisites: *COM 221, MA 345, PS 250, PS 253.*

EE 336

Electrical Engineering Laboratory I (0,3)
1 Credit

Laboratory experiments and techniques in electrical engineering. The Electrical Engineering Lab EE 336, must be taken during the same semester as EE 335.

EE 340

Electric and Magnetic Fields (3,0)
3 Credits

Electrostatics and magnetostatics. Study of magnetic and dielectric material properties; Maxwell's equations; energy and radiation of plane waves. Introduction of electromagnetic waves, transmission lines, the Smith chart, and radiation from antennas.

Prerequisites: *MA 441, PS 250.*

EE 355

CNS, Communications, Navigation Surveillance, Systems (3,0)
3 Credits

The basic fundamentals of airborne communications, navigation, and surveillance systems are covered in this course. Long-range and short-range communi-

Course Descriptions

cations are discussed, with particular emphasis on data transmission. En route and landing systems are covered. Space base navigation systems are covered with emphasis on the Global Positioning System. Surveillance systems include primary and secondary radar as well as ground proximity and terrain warning systems.

EE 401

Control Systems Analysis and Design (3,0)
3 Credits

Modeling, analysis, and design of analog and digital linear control systems using time and frequency domain techniques. Topics include feedback control system characteristics performance analysis and stability, Z-transforms and controller design.

Prerequisites: *EE 303, EE 320, or CEC 320.*

EE 402

Control Systems Laboratory (0,3)
1 Credit

Laboratory experiments involving the principles of operation and design of linear control systems. Experiments to support theory introduced in EE 401. Corequisite: EE 401.

EE 403

Avionics Communication Systems (3,0)
3 Credits

This course covers the fundamentals of communications systems, both digital and analog. This course is in preparation for other communications systems courses.

Prerequisites: *EE 302, EE 303.*

EE 406

Digital Signal Processing (3,0)
3 Credits

Discrete-time description of signals and systems. D/A and A/D conversion, sampling, and aliasing. Fourier transform of discrete signals, the discrete Fourier transform, and the Z-transform. Digital filter structures, filter implementation, and synthesis techniques. Digitization, quantization, and finite precision effects. Discrete system simulation and DSP applications.

Prerequisite: *EE 303. Corequisite: EE 407.*

EE 407

Digital Signal Processing Laboratory (3,0)
1 Credit

Analog and digital filter design using MATLAB Digital filter implementation with C programming and assembly code. Input/output, filtering, and waveform generation with a 32-bit floating-point DSP development system. Corequisite: EE 406.

EE 408

Data Communications (3,0)
3 Credits

This course is a continuation of EE 403 and covers the fundamentals of data communications. Subjects include basic modulation, encoding, error detection and error correction.

Prerequisite: *EE 403.*

EE 410

Communication Systems (3,0)
3 Credits

Theory and application of electronic communication systems; spectral analysis; modulation and demodulation techniques; transmitting and receiving systems. Behavior of receivers and transmitters in the presence of noise. Study of avionic radio systems presently in use, such as NAV, COMM, DME, ATCRBS, ILS, and others.

Prerequisites: *EE 303, EE 340.*

EE 412

Communication Systems Laboratory (0,3)
1 Credit

Laboratory experiments involving design and analysis of electronic communication circuitry and measuring performance characteristics and limitations of various communication components and systems. Corequisite: EE 410.

EE 415

Satellite Communications Systems (3,0)
3 Credits

This course covers all aspects of satellite communications systems. Orbits are discussed, such as GEO, MEO, and LEO, including highly elliptical orbits. The RF link for satellites is discussed with special considerations for various types of orbits. Typical spacecraft and ground station characteristics are studied.

EE 417

Digital Communications (3,0)
3 Credits

This course covers digital codes, including the understanding of the generation of common codes and the advantages and disadvantages of the various types of codes. Bandwidth considerations are introduced. Common distortion and interference phenomena are studied in terms of intersymbol interference, bit error rates, and the tools for analyzing these impairments, such as eye diagrams and constellation diagrams. Techniques for improving digital communications, including matched filters, error detection, error compression, and data compression, are discussed.

EE 420

Avionics Preliminary Design (3,0)
3 Credits

Study of FAA requirements governing design of airborne electronic equipment. Study of component and subsystem specification and design practices. Application of the above in the preparation of a proposal/design plan for an airborne electrical/electronic subsystem. Integrate the knowledge gained throughout the curriculum with practical aspects of the practice of engineering to enable the student to comprehend engineering as a pivotal aspect of the business cycle and to responsibly participate in society by the practice of his/her profession. The course will introduce the combination of hardware and software requirements and preliminary design, preparation of project, and testing plans following established industry standards.

Prerequisite: *senior standing.*

EE 421

Avionics Detail Design (3,0)
3 Credits

Continuation of EE 420 or EE 428. Senior-level project. Students will work as members of a team in the execution of winning proposals from EE 420/428. The course incorporates the combination of hardware and software detailed design, implementation, and testing following established industry standards.

Prerequisite: *EE 420 or EE 428.*

EE 422

Wired and Fiber Optic Communications (3,0)
3 Credits

This course applies the foundations laid down by EE 310 and EE 417 to wired and fiber optic communications. The course discusses the characteristics of theoretical and real transmission lines. The similarities of electrical transmission lines and fiber optic transmission are studied. Methods of establishing networks using electrical transmission lines are discussed and the impairments encountered by such networks are discussed. Fiber optic networks are introduced building on the foundation set down by the electrical transmission line networks.

EE 424

Wireless Communications (3,0)
3 Credits

This course studies the special situations associated with wireless communications, in particular from moving platforms. The basic physics of radio wave propagation are studied including signals, antennas, and multipath problems. Spread spectrum techniques are discussed along with other modulation methods applied to mobile radio including space-based systems. Cellular techniques are studied.

EE 425

Wireless Communications Lab (0,3)
1 Credit

This is the companion lab for EE 424. The lab provides practical experience through laboratory measurements and analysis in the subject areas covered by EE 424.

EE 427

Preliminary Design I (3,0)
1 Credit

Study of organizational structure, quality assurance, reliability, and system standards and specifications. Preparation of senior design specifications.

EE 428

Preliminary Design II (3,0)
1 Credit

Study of component and system testing. Preparation of senior design proposal.

Prerequisite: *EE 427.*

EE 450

Elements of Power Systems (3,0)
3 Credits

Electrical power conversion and control. Use of electronic devices as switches. Power computations for linear and nonlinear circuits, single and three-phase power distribution, and transformers. Controlled and uncontrolled rectification. AC voltage controllers, DC-DC converters, DC power supplies, DC-AC inverters, and resonant converters.

Course Descriptions

Prerequisite: *Senior standing or permission from instructor.*

EE 452

Power Systems Laboratory (1,2)
1 Credit

Laboratory projects in power conversion and control. Measurement techniques of average and apparent power, power factor, average and RMS voltage and current, and harmonics. PWM control circuits, power electronic circuit design, and thermal management techniques. Corequisite: EE 450.

EE 460

Advanced Controls and System Integration (3,0)
3 Credits

Continuation of EE 401. Study of modern control methods including state variables, controllability and observability, and modern design techniques. Integration of avionics systems by different avionics bus protocols including ARINC-429, ARINC-629, Mil Std 1553, and RS-232. Study of avionics systems common to modern aircraft. Design project.

Prerequisite: *EE 401 or equivalent.*

EE 475

Senior Telecommunications Project (2,3)
3 Credits

The capstone course for the telecommunications track. This course will entail a design project involving a broad spectrum of tasks including system design, software, hardware, test, and evaluation. The students will plan the project using the latest computer tools and monitor the progress. Group and interdisciplinary efforts are encouraged.

EE 299, EE 399, EE 499

Special Topics in Electrical Engineering
1-6 Credits

Directed studies of selected topics in electrical engineering.

Prerequisite: *consent of instructor and department chair.*

Engineering

EGR 101

Introduction to Engineering (1,2)
2 Credits

An introduction to the interdisciplinary aspects of the engineering of aerospace systems. This is a project-based course demonstrating how aerospace engineering, electrical engineering, computer engineering, civil engineering, and software engineering are combined to produce results. Students are involved in an array of conceptual exercises, simple design activities, and projects dealing with engineering in aerospace-related areas.

EGR 111

Engineering Drawing (2,0)
2 Credits

Freehand pencil sketching for graphical communication of engineering designs. Standard forms for design graphic and view layout, orthographic projection, section and auxiliary views, dimensioning, tolerancing, introduction to shop processes. This course is not equivalent to EGR 120.

EGR 115

Introduction to Computing for Engineers (3,0)
3 Credits

This is an introductory course in programming and computing for scientists and engineers. The course introduces students to the following aspects of software engineering: specification, requirements, design, code, and test. This course uses a problem-solving approach for developing algorithms. The following topics will be included: data types and related operations, looping, decision, input/output, functions, arrays, files, and plotting.

Prerequisite: *pre-Calculus or permission of the instructor.*

EGR 120

Graphical Communications (2,2)
3 Credits

Freehand pencil sketching and CAD as tools for graphical communication of engineering designs. Standard forms for design graphics and view layout, orthographic projection, section and auxiliary views, dimensioning, tolerancing, introduction to shop processes.

Prerequisite: *enrollment in an engineering program.*

EGR 200

Computer Aided Conceptual Design of Aerospace Systems (2,3)
3 Credits

Application and use of a high end computer aided design (CAD) tool for graphical communication of conceptual engineering designs. Includes definition of standards and conventions for generating part and assembly drawings as well as introductory methods for creating and documenting conceptual aerospace systems design. Application of rapid prototyping methods for constructing and integrating aerospace models as well as conceptual aircraft design.

EGR 305

3D-CADD and Engineering Documentation (3,0)
3 Credits

Application and use of high-end computer assisted drafting, design, and analysis tool (CATIA) to engineering challenges. Applications of CATIA workbenches: the product specification tree, knowledgeware, parametric design, part and assembly design, modification, document release and control, final drawings, and changes.

Prerequisites: *EGR 120, ES 201, ES 204.*

Electronics

EL 107

Direct and Alternating Current Fundamentals and Circuit Analysis (4,0)
4 Credits

A detailed study of basic DC and AC theory and circuit concepts. Subject areas include the physical nature of matter, Ohm's Law, DC and AC components, series and parallel circuits, reactance, resonance, and transformer theory.

Prerequisite: *MA 111 or MA 145. Corequisites: EL 108, MA 112.*

EL 108

Direct and Alternating Current Laboratory (0,3)
1 Credit

One three-hour laboratory session per week with experiments paralleling the material of EL 107. Corequisite: EL 107.

EL 203

Microelectronics Fundamentals and Circuit Analysis (4,0)
4 Credits

An introductory course in solid-state fundamentals and circuit analysis. Subject areas include semiconductor construction, biasing, small and large signal amplifier analysis, active devices, operational amplifiers, oscillators, and frequency considerations.

Prerequisites: *EL 107, EL 108. Corequisite: EL 204.*

EL 204

Microelectronics Laboratory (0,3)
1 Credit

One three-hour laboratory session per week with experiments paralleling the material of EL 203. Corequisite: EL 203.

EL 212

Digital Circuit and Systems Analysis (4,0)
4 Credits

An introduction to digital fundamentals and their applications to electronic and avionics systems.

Prerequisite: *EL 107. Corequisite: EL 213.*

EL 213

Digital Circuit Laboratory (0,3)
1 Credit

One three-hour laboratory session per week with experiments paralleling the material of EL 212. Corequisite: EL 212.

EL 301

Electronic Communication Systems (3,0)
3 Credits

Introduction to communications circuits and systems. Subject areas include AM, FM, and SS modulation and receivers, transmission lines, wave propagation, antennas, wave guides, microwave devices, data, communications, and radar fundamentals.

Prerequisites: *EL 203, EL 204, and MA 112 or MA 241.*

EL 302

Electronic Communications Laboratory (0,3)
1 Credit

One three-hour laboratory session per week with experiments paralleling the material of EL 301. Corequisite: EL 301.

EL 303

Pulse Components and Circuit Applications (2,0)
2 Credits

An introduction to pulse fundamentals and circuits and their response in high frequency applications.

Prerequisites: *EL 203, EL 212, and MA 112 or MA 241.*

Course Descriptions

EL 304

Pulse Circuits Laboratory (0,3)
1 Credit
One three-hour laboratory session per week with experiments paralleling the material of EL 303. Corequisite: EL 303.

EL 307

Microprocessor Systems (3,0)
3 Credits
An advanced course designed to acquaint the student with microprocessor architecture, software, and hardware. Subject areas include microprocessor organization, instruction sets, memory mapping software and hardware, microprocessor system design and interfacing to buses, I/O devices, memories, registers, and other digital devices.

Prerequisites: *EL 212, EL 213, and CS 223 or CS elective.*

EL 308

Microprocessor Systems Laboratory (3,0)
1 Credit
One three-hour laboratory session per week with experiments paralleling the material of EL 307. Corequisite: EL 307.

Engineering Physics

A grade of C or better is required in MA 241, MA 242, PS 140, PS 141, PS 215, and PS 216 for entry into all EP and ES courses.

EP 101

Current Topics in Space Sciences (1,0)
1 Credit
A survey seminar intended to explore contemporary topics encountered in the exploration of the upper atmosphere and near space environment.

EP 320

Electro-Optical Engineering (3,0)
3 Credits
Geometrical optics of mirrors, thin and thick lenses, prisms, and systems. Ray tracing with optical CAD. Fiber optics applications. Physical optics including interference, diffraction, and polarization. Phaser methods. Engineering considerations in choice of different types of detectors. Space systems applications. Image processing. Emphasis on design.

Prerequisites: *EGR 115 and PS 303. Corequisites: MA 345, PS 305.*

EP 340

Introduction to Space Systems Design (2,1.5)
2 Credits
An introduction to space mission analysis and design process, mission characterization, evaluation, and requirements definition. Introduction to computer-aided design (CAD). Numerical modeling and simulation of engineering systems, the finite element method, the finite difference method.

Prerequisite: *ES 202.*

EP 391

Microcomputers and Electronic Instrumentation (2,3)
3 Credits
This course will provide students with a background in electronics as it applies to the design of circuits of measuring instruments and to interface sensors and computers. The program of study will concentrate on following the form of the electrical signal from light, pressure, temperature, and other sensors as it proceeds through signal conditioning circuits and into the microcomputer for further processing. In the laboratory portion of the course the student will explore the design of pertinent regulated power supplies, amplifiers, logic circuits, filters, stepper motors, servo motors, and A-to-D and D-to-A converters. This work will serve as the basis for design project assignments to produce one or two working instruments that are interfaced to a microcomputer.

Prerequisites: *EGR 115, PS 219, PS 220, or instructor's waiver. Corequisite: MA 345.*

EP 393

Spaceflight Dynamics (2,0)
2 Credits
Basic topics in analytical dynamics, two body orbits and the initial value problem, the two body orbital boundary value problem, Earth coverage and space mission geometry, non-Keplerian effects, orbital maneuvers and rendezvous, and interplanetary transfer. Fundamentals of ascent flight mechanics, launch vehicle selection, fundamentals of entry flight mechanics, and the associated thermal control problem.

Prerequisite: *ES 204.*

EP 394

Space Systems Engineering (3,0)

3 Credits

Development of the fundamental principles used in the engineering and design of space systems. Several major subsystems including power, telemetry and command, communications, thermal control and guidance, navigation, and control subsystems are covered. Topics on space environmental control and life support systems, space system integration and testing and space system operations are also discussed.

Prerequisite: *AE 313 or EP 393 or consent of the instructor.*

EP 400

Thermodynamics and Statistical Mechanics (3,0)

3 Credits

Basic thermodynamics, entropy, kinetic theory, distribution of molecular velocities, Maxwell-Boltzmann statistics, Bose-Einstein statistics, Fermi-Dirac statistics, microcononical ensemble, canonical ensemble.

Prerequisite: *PS 303.*

EP 410

Space Physics (3,0)

3 Credits

Origin, evolution, and structure of neutral and ionized terrestrial atmosphere. Effect of sun's electromagnetic radiation on ozone shield. Photoionization and thermal structure of the neutral atmosphere as well as the ionosphere and magnetosphere. Solar disturbances and their effects on satellite orbit decay and on long-distance communication. Studies of composition, thermodynamics, and physical processes of the near-earth space environment. Rocket and satellite monitoring and remote sensing. Numerical and instrument design projects.

Prerequisite: *EP 320. Corequisite: EP 440.*

EP 420

Planetary Science (3,0)

3 Credits

Study of the planetary system: origin, evolution, composition, present configuration, dynamics, interiors, surfaces, atmospheres, and magnetospheres of the planets and, where appropriate, similar aspects of the satellites, asteroids, and comets. Interpretations of existing data and definition of future experiments to aid in determination of the origin and evolution of the solar system are stressed.

Prerequisite: *PS 303.*

EP 425

Observational Astronomy (2,3)

3 Credits

Basic design and use of an optical telescope, fundamentals of astronomical optics including refracting and reflecting systems, principles and applications of optical filters and adaptive optics. Design optimization and trade-offs in an observing system. Telescope system calibration and techniques for enhancing tracking accuracy. Visual observation and analysis of images of the sun, moon, planets, stars, nebulae, and galaxies. Electronic imaging including quantification of radiant energy, spectroscopy, and techniques for reducing the effects of noise sources. Optical and detector design trade-offs for measurement optimization.

Prerequisites: *PS 303, PS 305, and either PS 401 or PS 301.*

EP 440

Engineering Electricity and Magnetism (3,0)

3 Credits

Solutions of electrostatics problems using Poisson's equation and Laplace's equation, electrostatic energy, electric current, magnetic field, electromagnetic induction, physics of plasmas, Maxwell's equations, and application of Maxwell's equations (reflection, refraction, waveguides, antenna radiation). Students will write some simple computer programs.

Prerequisites: *EGR 115, MA 442, PS 303, PS 305, PS 320, or instructor consent.*

EP 455

Quantum Physics (3,0)

3 Credits

The Schrodinger equation in one and three dimensions and its solutions for step potentials, the harmonic oscillator, and the hydrogen atom. Operators and their matrix representations: Dirac bracket formalism, angular momentum and spin, spin-orbit interaction. Identical particles and exchange symmetries. Time-independent and time-dependent perturbation theory and approximation methods: transition rates, Fermi's rule, scattering theory. Classical and quantum statistical distributions.

Prerequisite: *EP 440 or instructor consent.*

Course Descriptions

EP 496

Space Systems Design I (1,3)
2 Credits

A program of undergraduate research, supervised by physics or engineering faculty, leading to the writing of a technical design report in an area of current interest in engineering physics.

Prerequisites: *EP 340 and EP 394.*

EP 497

Space Systems Design II (2,4)
3 Credits

This is a required course in the Engineering Physics program. It is the second of a two-semester sequence and completes senior design project requirements of this program. Continuation and completion of EP 496.

Prerequisite: *EP496.*

EP 199, 299, 399, 499

Special Topics in Engineering Physics
1-4 Credits

Individual, independent, or directed study of topics in the fields of applied physics, space systems, and allied engineering disciplines. Student design projects that involve significant engineering design such as microgravity experiments and moon-buggy design. May be considered as an engineering elective with approval of the program coordinator.

Engineering Science

A grade of C or better is required in MA 241, MA 242, and either PS 150 or PS 215 and PS 216 for entry into all ES courses. A passing grade in all

Prerequisite courses or department consent is required for entry into all ES courses.

ES 201

Statics (3,0)
3 Credits

A vector treatment of the concepts and characteristics of forces and couples. Distributed forces. Center of mass, centroid. Equilibrium of particles and rigid bodies. Trusses and frames. Internal forces. Shear and moment distribution in beams. Area moments of inertia.

Prerequisites: *PS 150 or PS 215, EGR 120 or EGR 111, or consent of the instructor. Corequisite: MA 243.*

ES 202

Solid Mechanics (3,0)
3 Credits

The concepts of stress and strain and their tensor properties. Elastic stress-strain relations. Analysis of stress and deformation in members subject to axial, torsional, bending, and combined loading. Column stability.

Prerequisite: *ES 201.*

ES 204

Dynamics (3,0)
3 Credits

A vector treatment of the kinematics and kinetics of particles and rigid bodies. Acceleration, work, energy, power, impulse, and momentum.

Prerequisite: *ES 201. Corequisite: MA 345.*

ES 206

Fluid Mechanics (3,0)
3 Credits

Physical characteristics of the fluid state. Fluid statics. Kinematics of fluid motion. Flow of an incompressible ideal fluid. The impulse-momentum principles. Similitude and dimensional analysis, fluid measurements.

Prerequisite: *ES 201.*

ES 207

Fundamentals of Mechanics (3,0)
3 Credits

Vector analysis of forces and moments. Equilibrium analysis of static systems. Center of gravity. Kinematics, kinetics, work and energy, impulse and momentum.

Prerequisite: *PS 150.*

ES 305

Thermodynamics (3,0)
3 Credits

A study of the concepts of heat and work and their transformation as governed by the first and second laws of thermodynamics. Properties of pure substances. Ideal gas behavior and relationships. Reversible processes and temperature-entropy diagrams. Conventional power cycles. Properties of ideal gas mixtures. Combustion.

Prerequisites: *ES 206 and PS 160 or PS 208 or consent of the instructor.*

ES 306

Fiber Optics (2.5,.5)
3 Credits

An introductory course on optical fiber technology and applications. Course covers optical waveguide theory (multi-mode and single-mode), light sources (LEDs and lasers), light detectors and how these components work together to form an electro-optical system. Applications to communications, sensors, and aviation are studied. Some laboratory work, computer design, and literature research are required to broaden student's viewpoint and to achieve 1 credit of engineering design.

Prerequisites: *MA 441, PS 160.*

ES 312

Energy Transfer Fundamentals (3,0)
3 Credits

First and Second Laws of Thermodynamics for control masses and control volumes. Fundamentals of heat transfer: conduction, convection, and radiation. Application of energy balances.

Prerequisite: *PS 160.*

ES 315

Space Environment and Effects (3,0)
3 Credits

This course studies the effects of the space environment on spacecraft and spacecraft design. The vacuum, neutral, plasma, radiation, and space debris environments and their effect on space missions are examined. Special emphasis is placed on investigating the effects of radiation on the electrical spacecraft subsystems and the space debris environment.

Prerequisites: *PS 250, junior standing, or instructor consent.*

ES 320

Engineering Materials Science (2,0)
2 Credits

Materials used in aeronautical engineering applications. Properties of materials and their measurements. Metals and their structures. Characteristics of metallic phases. Equilibrium diagrams. Processing of metals and alloys. Plastics, their structures, and characteristics. Ceramics and their characteristics. Composite materials. Corrosion. The Engineering Materials Science Lab ES 321 must be taken during the same semester as ES 320.

Prerequisites: *COM 221, ES 202, and PS 105 or PS 140 or consent of the instructor.*

ES 321

Engineering Materials Science Laboratory (0,3)
1 Credit

Laboratory experiments and techniques in materials science, composites, and solid mechanics. The Engineering Materials Science Lab must be taken during the same semester as ES 320.

ES 403

Heat Transfer (3,0)
3 Credits

One- and two-dimensional steady and unsteady state conduction heat transfer including an introduction to finite-difference and finite-element methods of analysis. Free and forced convection heat transfer. Radiation heat transfer.

Prerequisites: *ES 206 or permission of instructor, ES 305, MA 345.*

ES 405

Electrical Engineering II (3,0)
3 Credits

Diode, transistor, and operational amplifier circuit analysis. System block diagrams, feedback, and transfer functions. Digital and analog computer principles. Boolean algebra, logic gates, and microprocessors. Rotating electrical machines, transformers, and other electro-mechanical energy conversion devices.

Prerequisite: *EE 335.*

ES 412

Structural Dynamics (3,0)
3 Credits

Simple harmonic motion. Undamped and damped free vibration and forced vibration. Multiple degrees of freedom. Multi-mass torsional and transverse systems. Equivalent torsional systems. Balancing. Dynamic damping. Computer analysis using finite element modeling.

Prerequisites: *ES 202, ES 204, MA 345.*

ES 413

Engineering Fundamentals Review (1,2)
1 Credit

This course is a review of fundamental engineering principles. Problem-solving tutorial sessions help engineering students prepare for the National Fundamental Engineering or Engineering-In-Training Examination.

Prerequisite: *senior status.*

Course Descriptions

ES 299, 399, 499

Special Topics in Engineering Science

1-6 Credits

Individual independent or directed studies of selected topics in engineering science.

Prerequisites: *consent of instructor and department chair. May be repeated with change of content.*

Flight-Academic

FA 109

Intermediate Flight Transition and Procedural Familiarization

3 Credits

A review of elementary commercial pilot flight operations including basic aircraft control, elementary radio navigation, air traffic control procedure, cross-country operations, and solo flight. Associated ground instruction will include a review of knowledge areas required for Private Pilot certification. This course is specifically designed for students entering Embry-Riddle's Commercial Pilot program with a Private Pilot certificate and desiring advanced standing.

Prerequisite: *FAA Private Pilot Certificate with Airplane Single-Engine Land Rating.*

FA 132

Commercial Pilot Flight I

1 Credit

During this course the student obtains the foundation for all future aviation training. The student will be introduced to the fundamentals of flight and become proficient in basic maneuvers and operating procedures required for solo flight. Emphasis will be placed on developing a safe and competent student pilot who is adequately prepared for solo, cross-country, and night operations. The student will receive training in safety awareness, crew resource management, and aeronautical decision-making. Corequisite: AS 132. (NOTE FOR DAYTONA BEACH CAMPUS: The FAA requires AS 132 to be completed at Embry-Riddle with a "C" or higher. Students who transfer credit for AS 132 will be required to complete additional ground training in FA 132 to meet the FAA requirement.)

FA 133

Commercial Pilot Flight II

1 Credit

The student will receive additional training in safety awareness, cross-country, and night operations, crew resource management, and aeronautical decision making. At the successful completion of this course, the student will have met the requirements of the FAA Private Pilot practical test standards and gained the aeronautical experience necessary to apply for the FAA Private Pilot Certificate, Single and Multi-Engine Land Ratings.

Prerequisites: *FA 132 or FAA Private Pilot Certificate. Corequisite: AS 132 or AS 133. (NOTE FOR DAYTONA BEACH CAMPUS: the FAA requires AS 133 to be completed at Embry-Riddle with a "C" or higher. Students who transfer credit for AS 133 will be required to complete additional ground training in FA 133 to meet the FAA requirement.)*

FA 208

Commercial Pilot Flight Operations II

2 Credits

Flight training in advanced VFR cross-country operations and multi-engine operations and procedures. At the completion of this course, the student will have fulfilled the majority of cross-country requirements for commercial certification. In addition, the student will have gained the aeronautical knowledge, skill, and experience to apply for an additional multi-engine class rating to his/her existing FAA Private Pilot Certificate.

Prerequisite: *FA 109 or FA 110.*

FA 215

Upset Training

1 Credit

This flight course is designed to give certified pilots the experience and knowledge to immediately recognize aircraft upset situations and the skills to safely and precisely recover from such occurrences. This course will include flight recoveries from-nose high, nose-low, and inverted attitudes; spin entries and recoveries; and basic aerobatic maneuvers.

FA 232

Commercial Pilot Flight III

1 Credit

The student will receive training in the maneuvers and procedures necessary for him/her to meet the standards contained in the FAA instrument rating practical test standards. Additionally, the student will receive training in cockpit resource management and safe flying practices. At the successful completion of this course the student will have gained the aeronautical experience necessary to apply for the addition of the FAA Instrument Airplane Rating to his/her Private Pilot Certificate.

Prerequisites: *AS 133 and FA 133 or FAA Private Pilot Certificate Single-Engine/Multi-Engine Land. Corequisite: AS 232. (NOTE FOR DAYTONA BEACH CAMPUS: the FAA requires AS 232 to be completed at Embry-Riddle with a "C" or higher. Students who transfer credit for AS 232 will be required to complete additional ground training in FA 232 to meet the FAA requirement.)*

FA 251

Commercial Pilot Flight Operations III

3 Credits

Flight, ground, and simulator training in basic attitude instrument flight procedures and techniques. The student will be taught to maneuver the airplane in actual or simulated instrument conditions by radio and radar navigation while complying with departure, en route, and arrival ATC procedures and clearances.

Prerequisite: *FA 208. (FAA Part 141 approved.)*

FA 272

Commercial Pilot Flight IV

1 Credit

The student will receive training in the maneuvers and procedures necessary for him/her to meet the standards contained in the commercial pilot practical test standards. Additionally, the student will receive training in cockpit resource management and safe flying practices. At the successful completion of this course the student will have gained the aeronautical experience necessary to apply for the FAA Commercial Pilot Rating, Multi-Engine Land with Instrument Rating.

Prerequisites: AS 232 and FA 232 or FAA Private Pilot Single Engine Land/Multi-Engine Land Certificate with Instrument Rating. Corequisite: AS 272. (NOTE FOR DAYTONA BEACH CAMPUS: the FAA requires AS 272 to be completed at Embry-Riddle with a "C" or higher. Students who transfer credit for AS 272 will be required to complete additional ground training in FA 272 to meet the FAA requirement.)

FA 273

Commercial Single Engine Add-On

1 Credit

The student will receive the flight training required to add a FAA Commercial Pilot Single-Engine rating to his/her FAA Commercial Multi-Engine/Instrument Pilot Certificate.

Prerequisite: *FA 272 or FAA Commercial Multi-Engine/Instrument Certificate.*

FA 304

Commercial Pilot Flight Operations IV

2 Credits

Flight and simulator training in instrument approach procedures and associated pilot operations including instrument cross-country operations. At the successful completion of this course the student will have gained the aeronautical knowledge necessary for the addition of an instrument-airplane rating to his/her FAA Private Pilot Certificate.

Prerequisite: *FA 251. (FAA Part 141 approved.)*

FA 325

Commercial Pilot Flight Operations V

2 Credits

Flight training in maximum performance and precision commercial flight maneuvers and a review of the pilot operations required of a commercial pilot. At the completion of this course, the student will have gained the aeronautical knowledge, skill, and experience necessary to apply for the FAA Commercial Pilot Certificate with Instrument Airplane Single- and Multi-Engine Land ratings.

Prerequisite: *FA 304. (FAA Part 141 approved.)*

FA 340

Multi-Engine Class Rating

1 Credit

Instruction and flight training to provide the aeronautical skill and knowledge to meet the requirements for the addition of a Multi-Engine Land class rating with instrument privileges to the student's existing FAA Commercial Pilot Certificate.

Prerequisite: *FAA Commercial Pilot Certificate with an Instrument rating. (FAA Part 141 approved.)*

Course Descriptions

FA 341

Advanced Commercial and Instrument Flight Operations and Procedural Familiarization

2 Credits

A review of the pilot operations required of a commercial pilot including maximum performance and precision commercial flight maneuvers as required. A review of instrument pilot operations including basic attitude instrument flying, holding, precision and nonprecision instrument approaches, with emphasis placed on the pilot-in-command instrument cross-country operations. Associated ground instruction will include a review of knowledge areas required for the Commercial Certificate with an Instrument rating as required. This course is specifically designed for students entering the Aeronautical Science program with a Commercial Certificate with Airplane Single-Engine Land and Instrument Airplane ratings.

FA 370

Advanced Multi-Engine Instrument Flight

1 Credit

Introduction to autopilot and flight director operations to further develop instrument piloting skills to the ATP level. In addition, the student is introduced to advanced cross-country operations, with emphasis on precision flying skills and the use of automated flight management systems in an IFR environment.

Prerequisites: *AS 272 and a Commercial Pilot Certificate with a Multi-Engine class rating and Instrument Airplane rating.*

FA 417

Flight Instructor Rating

3 Credits

The student will receive training in the maneuvers and procedures necessary for him/her to meet the standards contained in the Flight Instructor practical test standards, Single-Engine Land with Instrument Airplane rating. Additionally, the student will receive training in cockpit resource management and safe flying practices. Associated ground instruction will include completion of the Fundamentals of Instruction, the Flight Instructor Airplane, and the Flight Instructor Instrument written test.

Prerequisite: *FAA Commercial Pilot Certificate with Single-Engine and Instrument rating.*

FA 418

Airline Transport Pilot Proficiency Development

1 Credit

Certified Commercial and Instrument rated multi-engine pilots are provided extensive detailed instrument-oriented training to airline transport pilot proficiency standards. Emphasis is placed on precision attitude flying techniques including configuration change procedures, attitude and thrust setting determination, and velocity transitions; precise instrument approach and departure procedures; and integration of applicable emergency procedures during all phases of instrument flight.

Prerequisites: *FAA Commercial Pilot Certificate with Airplane Single- and Multi-Engine Land and Instrument-Airplane ratings.*

FA 420

Airline Flight Crew Techniques and Procedures

2 Credits

Instruction in airline flight crew operations with emphasis on the transition of the professionally qualified pilot into a highly skilled member of an air carrier flight management team.

Prerequisites: *Commercial Pilot Certificate with Multi-Engine/Instrument Airplane rating, AS 387, AS 420, AS 435.*

FA 460

Multi-Engine Flight Instructor Rating

2 Credits

The student will receive training in the maneuvers and procedures necessary for him/her to meet the FAA standards required to add the Multi-Engine Flight Instructor rating to his/her CFI/I rating. Additional instruction will be provided in advanced multi-engine flight crew training techniques including cockpit resource management and safe flying practices.

Prerequisites: *FA 417 or FAA Commercial Pilot Certificate with Airplane Multi-Engine Land and Instrument-Airplane ratings and a FAA Flight Instructor Certificate with an Instrument Airplane rating.*

FA 199, 299, 399, 499

Special Topics in Flight

0-2 Credits

Flight training in selected areas for the purpose of gaining proficiency in required pilot operations for various certificates and ratings.

Prerequisites: *approval of chief flight instructor and department chair.*

Honors

HON 150

Honors Seminar I (3,0)

3 Credits

This course is open only to freshmen enrolled in the Honors program, and will satisfy the lower level Humanities requirement in general education. An interdisciplinary Humanities course, it focuses on aesthetic, philosophical, and historical aspects of a subject, making use of text materials from several disciplines and varied media. The course also emphasizes student participation in a seminar discussion format and requires that students develop their research, critical thinking, and oral and written communication abilities. Requirements will include (but will not be limited to) text and Web-based original research, written essays, oral presentations, and participation in group discussion. Topics may vary according to instructor.

HON 250

Honors Seminar II (3,0)

3 Credits

This course is open only to students enrolled in the Honors program, and will satisfy 3 credits of the lower-level Social Sciences requirement in general education. The course focuses on material pertinent to one or more disciplines within the broad arena of the Social Sciences. Specific emphases will vary by instructor. The course also emphasizes student participation in a seminar discussion format and requires that students develop their research, critical thinking, and oral and written communication abilities. Requirements will include (but will not be limited to) text and Web-based original research, written essays, oral presentations, and participation in group discussion.

HON 350

Honors Seminar III (3,0)

Honors Seminar III will satisfy either the Humanities or Social Sciences upper-level elective requirement in general education. Building on the previous two Honors seminars, it will require students to further develop their ability to locate and assess primary and secondary research materials, to present effective verbal and written presentations that display more sophisticated research and presentational sensibilities, and to engage in discussion that is rooted in close reading of assigned and unassigned material. Whatever the specific course topic, the seminar will be an interdisciplinary exploration of the subject, will emphasize student participation in focused class discussion, and will foster further development of research, critical thinking, and oral and written communication abilities. Topics vary by instructor.

Human Factors

HF 300

Human Factors I: Principles and Fundamentals (3,0)

3 Credits

This course is intended to provide the student with an understanding of the basic principles of Human Factors Psychology. We will study the research, principles, and methods that are beneficial (and essential) in optimizing the interaction between people and machine elements of a system, while taking the environment into account.

Prerequisite: *PSY 220.*

HF 302

Human Factors II: Analytic Methods and Techniques (3,0)

3 Credits

Covers a variety of engineering and behavioral analytic methods and techniques critical to the study of work performance. Provides required tools needed to accomplish workload analysis as a requisite to a systems design or a redesign of an existing system.

Prerequisite: *HF 300.*

HF 305

Human Factors III: Ergonomics and Bioengineering (3,0)

3 Credits

Advanced applications from a variety of bioengineering subfields are identified and defined with respect to their importance in the practice of human factors. Quantitative methods for the analysis of human movement. Topics include anthropometry, kinematics, kinetics, work and power, muscle mechanics, and electromyography. Introduces students to the application of ergonomic principles to the industrial environment. Includes subject matter on ergonomic planning and implementation, the work environment, NIOSHA work factors, and workstation equipment and design.

Prerequisite: *HF 300.*

Course Descriptions

HF 310

Human-Computer Interaction (3,0)

3 Credits

The application of cognitive principles, ergonomics, and human factors guidelines and principles to the design and evaluation of human-computer systems. Topics include display technologies, human visual capacities, design of display parameters, and image quality metrics.

Prerequisite: *HF 302 or permission of the instructor.*

HF 315

Automation and Systems Issues in Aviation (3,0)

3 Credits

This course will involve analyzing and discussing the most current issues relevant to the new generation of aviation systems. Assumptions on which current systems are based will be identified and alternatives examined.

Prerequisite: *HF 300.*

HF 320

Processes Underlying Crew Resource Management (3,0)

3 Credits

This course will examine the interpersonal and intrapersonal psychological processes underlying crew resource management (CRM). Emphasis will be on the foundations of group dynamics, social interactions, and the theoretical basis of CRM. Topics such as communication styles, supervisory styles, decision-making styles, accountability, and role management will be studied.

Prerequisite: *HF 300.*

HF 325

Human Factors and System Safety (3,0)

3 Credits

This course emphasizes the integration of human factors in all phases of a system's life-cycle. Accident prevention, beginning with systems engineering together with sound management, are combined in this course to enable the student to fully comprehend the human's vital roles in preventing accidents. The total program, from basic design concepts through testing, maintenance/systems management, and operational employment, is fully examined and evaluated.

Prerequisite: *HF 300.*

HF 330

Human Factors in Space (3,0)

3 Credits

This course is intended to provide the student with an understanding of the basic principles and knowledge of aerospace human factors. Emphasis will be on the human factors issues with living and working in space. In this course the student will study the research, principles, and methods that are beneficial (and essential) in optimizing the interaction between people and machine elements of aerospace systems.

Prerequisite: *HF 300.*

HF 335

Human Factors in Air Traffic Control (3,0)

3 Credits

A comprehensive examination of the application of human factors to air traffic control systems. The course covers the full range of applications of human factors.

Prerequisite: *HF 300.*

HF 340

Human Factors and Product Liability (3,0)

3 Credits

This course will provide the student with an understanding of the legalities and liabilities of product manufacturing. Topics to be covered will include: what is required of a manufacturer when designing a product for human use, what can go wrong, the role of expert witnesses in a product liability case, a review of specific case studies, and a discussion of awards to plaintiffs.

HF 345

Human Factors Issues in Lifespan Development (3,0)

3 Credits

This course presents the student with fundamental knowledge of human development in the following areas: cognitive, physical, emotional, and social. Once knowledge about development at all ages has been established, we will discuss human factors principles in the design of tools and machines specific to the particular capabilities and limitations of each age group.

HF 400

Human Factors IV: System Design (3,0)

3 Credits

Application of human factors concepts to system design. Develops human factors influence on system dynamics, structure, and control as well as impact on reliability and maintainability. Emphasizes the design of control-display integration, cockpit configuration, maintainability, and reliability. Emphasizes the significant human factors contributions to the design of state-of-the-art aerodynamic and space systems.

Prerequisites: *HF 302 and HF 305.*

HF 405

System Performance Modeling (3,0)

3 Credits

Studies quantitative means of modeling, analyzing, and predicting the performance of human-machine systems. Topics include queuing models, system simulation, model validation, data collection, quantitative analysis of system performance, system design evaluation, estimation theory, control theory, fuzzy set theory, information theory, and knowledge-based systems.

Prerequisites: *HF 400, MA 241.*

HF 410

Human Factors Engineering: Crew Station Design (3,0)

3 Credits

In-depth treatment of human factors principles applicable to design of crew command centers for aerodynamic, aviation/aerospace systems.

Prerequisite: *HF 300.*

HF 415

Human Factors in Simulation Systems (3,0)

3 Credits

This course provides a comprehensive examination of the human factors aspects of simulation in modern aviation/aerospace. Topics will include history, state-of-the-art simulation systems, and current research and development. Discussion focuses on the extent and impact of human factors in simulator training. Topics from flight crew training, evaluation, effectiveness, and simulator sickness are examined in detail.

Prerequisites: *HF 300, PSY 310.*

HF 420

Advanced Topics in Human-Computer Interaction (3,0)

3 Credits

Seminar exposing students to the theoretical and research issues associated with human-computer interaction (HCI) and cognitive-oriented work from a human factors standpoint.

Prerequisites: *HF 300, HF 310.*

HF 425

Human Factors in Computer Systems Design (3,0)

3 Credits

Theoretical paradigms in human-computer interaction and their application to interface design are examined. Emphasis is placed on advanced interface technologies such as multimodel input/output, hypertext, and knowledge-based systems.

Prerequisites: *HF 300, HF 310.*

HF 430

Tests and Measurements (3,0)

3 Credits

This course will cover the basic principles of psychometric theory, including test reliability and validity. Test and survey revision techniques and item analysis procedures will also be covered. Logistical issues surrounding test administration, scoring, and analysis will be addressed. After the basic psychometric principles have been covered, data collection and analysis based on fight simulation, eye-tracking equipment, and other common HF tools will be provided.

HF 490

Practicum in Human Factors Psychology (3,0)

3 Credits

Supervised applied practicum experience. This requirement may be fulfilled in several ways including co-ops, internships, or working on an on-campus research team. Practica provide opportunities to gain practical experience in real world-settings. The student completes a specific project under the supervision of an organizational sponsor and/or a faculty member.

Prerequisites: *approval of advisor and department chair.*

Course Descriptions

HF 299, 399, 499

Special Topics in Human Factors Psychology (3,0)
1-6 Credits

An area of study under the direct supervision of a faculty member. The course requirements and area of study are negotiated between the faculty member and the student with the approval of the department chair.

Prerequisites: *approval of advisor and department chair.*

Homeland Security

HS 201

Introduction to Homeland Security
3 Credits

The primary focus of this course is on issues dealing with the security of the citizens and industries of the United States, with emphasis on the transportation system and critical infrastructure protection roles of the states, cities, and municipalities. Specific subjects introduced include the mission, the functions and responsibilities, and the legislative and regulatory framework governing the various agencies of the Department of Homeland Security, criminal acts against transportation, emergency management within the United States, the Intelligence Community and its role in homeland security, and issues pertaining to air, maritime, surface, and cargo security.

HS 301

Fundamentals of Transportation Security
3 Credits

The primary focus of this course is on security in all modes of public transportation. Students will study the governmental organizations responsible for the security of people and property while being transported by air, rail, marine, or on the highways, as well as the federal regulations governing security in these modes of transportation. Specific subjects discussed include the federal regulations governing all modes of transportation, the role of safety and security program managers, airport security, air carrier security, foreign and indirect air carrier security, cargo security, transportation of dangerous goods, and the role of security-oriented technology.

Prerequisite: *HS 201*

HS 302

Fundamentals of Occupational Security
3 Credits

This course will introduce the student to the fundamentals of security and emergency planning including the nature, scope, history, and essential elements of security in the workplace, with emphasis on the transportation industry. Specific areas include the operational aspects of security strategies for identifying and controlling security exposures, applicable legal issues, personal protection, property protection, role of intelligence, and concepts of disaster planning and management.

HS 306

Legal and Investigative Issues of Security
3 Credits

This course is designed to provide the student with an understanding of the legal issues involved in the development, implementation, and operational aspects of administering a security program. Emphasis is placed on the framework of the legal system in the United States, as well as the international legal system. Specific subjects covered include the Patriot and Freedom of Information Acts, as well as other security-related acts, conventions, and agreements to which the United States is a party, the legal rights of the traveling public and those empowered to enforce security regulations, private security issues, and the part federal agencies play in supporting local law enforcement personnel.

HS 307

Law Enforcement in Security
3 credits

This course is designed to provide the student with an understanding of the objectives and tactical issues and methods employed by those persons empowered to establish and enforce security programs. Emphasis is placed on the enforcement of required security programs involving transportation, including airports and air carriers. Specific subjects covered include the role of the law enforcement officer in security, and in emergency response, counter-terrorism, and witness interviewing.

HS 401

Emergency Planning, Response, and Security Management
3 Credits

This course studies the various elements involved with planning for and responding to workplace, transportation, and natural disasters and emergencies. This course will adopt an all-hazards approach to the general and technical aspects of disaster planning and response including the incident management system, alarm, warning, and communications systems, evacuation, medical response, search and rescue, media and information management, and business recovery. Case studies will be examined through the existing structures of government agencies such as FEMA, EPA, OSHA, FAA, NTSB, as well as local first responder organizations.

Prerequisite: *HS 302.*

HS 402

Security and Risk Analysis

3 Credits

This course is designed as a capstone course for the Homeland Security degree and will focus on the fundamentals of risk analysis: threat identification, vulnerability analysis, and the consequent measures of risk as applied to critical infrastructures, with an emphasis on transportation systems. Topics include adversary characterization, critical asset identification, consequent analysis, vulnerability analysis of targets and facility characterization, risk ranking, assessment of countermeasures, cost benefit and analysis, and security auditing. A project dealing with the securing of a facility is an integral part of this course.

Prerequisite: *HS 401.*

Humanities

HU 125

Choral Union (3,0)

1 Credit

A singing organization open to all members of the university community. Training in choral techniques, acquaintance with choral music of all periods. (May be elected up to eight times for open elective credit.)

HU 130

Elementary Spanish I (3,0)

3 Credits

Basic grammar and reading. Introduction to conversation. Not open to students with two or more years of high school Spanish or the equivalent.

HU 135

Elementary Spanish II (3,0)

3 Credits

A continuation of HU 130.

The Humanities 140 Series

The HU 140 series constitutes an integral component of the University's General Education Program. This series offers students a variety of choices, each course fulfilling a lower-level requirement in the humanities. Courses in the HU 140 series emphasize writing, reading, and appreciation skills and are designed to expose students to the complexity of human emotions and experiences. Students also explore the framework of historical and cultural contexts in which artistic and creative expressions have arisen.

In selecting a course from the HU 140 series, students have opportunities to concentrate their studies on one form of cultural expression, such as music, literature, or the visual arts. Others may opt for a course that provides a chronological examination of a cultural expression or a thematic approach to several disciplines in the humanities.

HU 140

Western Humanities I: Antiquity and the Middle Ages (3,0)

3 Credits

A continuation of COM 122 with an interdisciplinary emphasis. Traces the evolution of the Western humanistic tradition from antiquity to the Middle Ages using examples from art, architecture, music, philosophy, and literature. Emphasizes writing, reading, and appreciation skills.

Prerequisite: *COM 122.*

HU 141

Western Humanities II: Renaissance to Postmodern (3,0)

3 Credits

A continuation of COM 122 with interdisciplinary emphasis. Traces the evolution of the Western humanistic tradition from the Renaissance to the Postmodern using examples from art, architecture, music, philosophy, and literature. Emphasizes writing, reading, and appreciation skills.

Prerequisite: *COM 122.*

HU 142

Studies in Literature (3,0)

3 Credits

A continuation of COM 122 with emphasis on a survey of literature. Reading materials include selected novels, poems, and plays. Emphasizes writing, reading, and appreciation skills.

Prerequisite: *COM 122.*

Course Descriptions

HU 143

Introduction to Rhetoric (3,0)

3 Credits

A continuation of COM 122, HU 143 offers a broad survey of rhetorical theory and practice. Whether noble or base, rhetoric primarily uses language to achieve a desired end, usually persuasion. This course employs primary and secondary readings as a means to examine how rhetorical principles manifest themselves in a variety of cultural texts and to understand the powers of persuasion. Although instructors may choose various approaches to teaching this course, students should expect some exposure to classical rhetoricians.

Prerequisite: *COM 122.*

HU 144

Studies in Art (3,0)

3 Credits

A continuation of COM 122 with an emphasis on art. Provides a foundation in the basic vocabulary, concept, processes, and history of art. Works of art, sculpture, architecture, and film from various cultures are analyzed. Emphasizes writing, reading, and appreciation skills.

Prerequisite: *COM 122.*

HU 145

Themes in the Humanities (3,0)

3 Credits

A continuation of COM 122 with interdisciplinary emphasis. Through close reading of primary texts and analysis of visual and performing arts, Themes in the Humanities explores ideas central to the evolution of culture. The course is not restricted by period and is open to the full range of humanistic studies. Themes vary by instructor and are listed in the Schedule of Courses. Emphasizes writing, reading, and appreciation skills.

Prerequisite: *COM 122.*

HU 146

Music Appreciation and Criticism (3,0)

3 Credits

A continuation of COM 122 with an emphasis on listening to and writing about music. Elements of music (rhythm, meter, tempo, pitch, and pitch relationships), instruments of music, and musical forms. The course emphasizes Western classical music.

Prerequisite: *COM 122.*

HU 152

French I (3,0)

3 Credits

Elementary oral-aural introduction to French including such topics as courtesy phrases, basic vocabulary, and patterns for questions and answers. Not open to students with two or more years of high school instruction or the equivalent, or to native speakers of the language.

HU 153

French II (3,0)

3 Credits

A continuation of HU 152.

Prerequisite: *HU 152 or permission of the instructor.*

HU 154

German I (3,0)

3 Credits

Elementary oral-aural introduction to German including such topics as courtesy phrases, basic vocabulary, and patterns for questions and answers. Not open to students with two or more years of high school instruction or the equivalent, or to native speakers of the language.

HU 155

German II (3,0)

3 Credits

A continuation of HU 154.

Prerequisite: *HU 154 or permission of the instructor.*

HU 160

Mandarin Chinese I (3,0)

3 Credits

Introduction to Mandarin Chinese language, including the pronunciation system (pin yin), basic grammar, traditional character writing and reading, speaking simple sentences, as well as cultural contexts inseparable from the language. Open only to those without prior knowledge of Mandarin Chinese or with consent of instructor.

HU 161

Mandarin Chinese II (3,0)

3 Credits

A continuation of Mandarin Chinese I.

Prerequisite: *Satisfactory completion of Mandarin Chinese I or consent of instructor.*

HU 250

Introduction to Logic (3,0)
3 Credits

Principles of valid thinking; the nature of inductive and deductive inferences and their applications.

Prerequisite: *Any course from the HU 140 series.*

HU 270

Mandarin Chinese III (3,0)
3 Credits

A continuation of Mandarin Chinese II with emphasis on communicative abilities in listening, speaking, reading, and writing.

Prerequisite: *Satisfactory completion of Mandarin Chinese II or consent of instructor.*

HU 271

Mandarin Chinese IV (3,0)
3 Credits

A continuation of Mandarin Chinese III.

Prerequisite: *satisfactory completion of Mandarin Chinese III or consent of instructor.*

HU 300

World Literature (3,0)
3 Credits

Major works and literary trends in world literature. Course content varies by instructor and is listed in the Schedule of Courses.

Prerequisite: *Any course from the HU 140 series.*

HU 302

Contemporary Issues in Science (3,0)
3 Credits

This course bridges science and the humanities, examining how different disciplines approach problems of common interest. Students study selected contemporary issues such as stem cell use in medicine, evolution vs. intelligent design, imminent worldwide crises, DNA engineering, responses to climate change, and possible problems associated with autonomous machines and artificial intelligence. As they examine their own assumptions while participating in debates that encourage appreciation of other viewpoints, students demonstrate understanding of course topics in class discussion and formal papers. The course is team-taught by a Physical Sciences professor and a Communication professor, and will include guest experts on selected topics.

Prerequisite: *COM 221.*

HU 305

Modern Literature (3,0)
3 Credits

The mainstreams of literature of this century. Course content varies by instructor and is listed in the Schedule of Courses.

Prerequisite: *Any course from the HU 140 series.*

HU 310

American Literature (3,0)
3 Credits

A survey of intellectual backgrounds, major works, and literary trends in American literature. Course content varies by instructor and is listed in the Schedule of Courses.

Prerequisite: *Any course from the HU 140 series.*

HU 315

Drama Seminar (3,0)
3 Credits

Students are exposed to the theater arts and especially to performance. They acquire acting skill through class exercises and performance assignments. Dramatic literature is studied with special attention given to its stage applications. Students may participate either as actors or technicians in the theatrical production, which entails out-of-class rehearsal.

Prerequisite: *COM 219.*

HU 319

Advanced Speech (3,0)
3 Credits

This course continues the study of oral communication with emphasis on effective public speaking. It includes the analysis and practice of modern and traditional methods of persuasion within and beyond the classroom.

Prerequisite: *COM 219.*

HU 320

Aesthetics of Visual and Musical Arts (3,0)
3 Credits

Provides a survey of the major artistic monuments of Western culture and discusses the methods by which artistic productions are analyzed.

Prerequisite: *Any course from the HU 140 series.*

Course Descriptions

HU 321

Mythology (3,0)
3 Credits

This course introduces the study of the myths of humankind, both ancient and modern, using perspectives and methods from archeology, anthropology, psychology, literature, and film. It explores what myths reveal about the human psyche and about historical and modern cultures. It builds facility in symbolic thinking and critical understanding of how this thinking influences contemporary literature, art, film, communication, and politics.

Prerequisite: *any course from the HU 140 series.*

HU 325

Exploring Film (3,0)
3 Credits

A survey of the art of the film. History of the cinema. Basic elements, photography, continuity and rhythm, movement, imaging, music and sound, script writing, directing, editing, acting, great film artists/directors, cinematographers, actors, etc.

Prerequisite: *any course from the HU 140 series.*

HU 330

Values and Ethics (3,0)
3 Credits

This course focuses on the process of practical ethics as a way of resolving moral conflict and of understanding professional responsibility in a multiculturally diverse society without devaluating specific viewpoints of ethical or metaphysical theory, ideology, or religion. Students will use proposals, value judgments, observation statements, assumptions, and alternate-world assumptions in arguing contemporary issues of moral importance. With this basic moral logic, students will resolve issues in terms of rights, responsibilities, and the community of rational beings in terms of consequences and contingencies and in terms of habituated virtues and character. Free and unrestricted discourse will be encouraged to let students find common ground in diversity.

Prerequisite: *any course from the HU 140 series.*

HU 335

Technology and Modern Civilization (3,0)
3 Credits

A humanistic analysis of technology, with special attention to its influence on modern American culture in a global context. Topics include the history and development of technology, the influence of technology on certain philosophies such as determinism and utilitarianism, the influence of technology on the ecosphere, and the depiction of technology in imaginative literature.

Prerequisite: *any course from the HU 140 series.*

HU 338

Traversing the Borders: Interdisciplinary Explorations (3,0)
3 Credits

This course entails the study of different approaches to gathering, analyzing, and interpreting information. Special attention is directed to recognizing connections between the boundaries of traditional disciplines. Study also involves in-depth research into a single reality-altering event. Investigation focuses on how people trained in different ways of thinking participate in and contribute to their society and the world by shaping new cultural meanings.

HU 341

World Philosophy (3,0)
3 Credits

This course focuses on an investigation of some of the central problems of philosophical inquiry such as what we can know and what we cannot know, how we reason, who we are, why we are here, and what we can hope for. Freedom, beauty, knowledge and logical thinking, mind, morality, god or gods, religion, truth, death, and existence might be explored using a variety of sources, including but not limited to contemporary thinkers of the European and the Anglo-American traditions. This course is designed to challenge assumptions and to help students deal with contemporary philosophical issues.

Prerequisite: *Any course from the HU 140 series.*

HU 345

Comparative Religions (3,0)
3 Credits

A survey of the major religions of the world, including Judaism, Christianity, Islam, Hinduism, Buddhism, and Confucianism, as well as a brief examination of the development of religion as a vital aspect of humanity's experience in history.

Prerequisite: *Any course from the HU 140 series.*

HU 355

Creative Writing (3,0)
3 Credits

The course culminates the interpretive and expressive elements of communications classes. The study, practice, and use of a personal style of creative composition and examples of contemporary literature and submittal of publications are included in this course.

Prerequisite: *any course from the HU 140 series.*

HU 361

Interpersonal Communication in the Work Group (3,0)

3 Credits

Examination of interpersonal and small-group communication topics to focus on maximizing decision making in work groups. Students are assigned to simulated consensus-driven groups. Evaluation is based on the quality of the groups' decision making, exams, class participation, and presentation of the groups' findings in a public setting.

Prerequisite: *COM 219.*

HU 362

Communication and Organizational Culture (3,0)

3 Credits

Theory, survey, and application of research methods for the analysis of communication. Instructors may choose to apply methods in a variety of contexts, such as in-house publications, internal communication, speeches, and interview communication.

Prerequisites: *COM 219 and COM 221.*

HU 363

Communication and Society (3,0)

3 Credits

An examination of human communication in a variety of cultural settings. Topics vary from semester to semester. Communication behavior is viewed expansively to include verbal discourse, symbolic imagery, nonverbal communication, literature, music, and other art forms. Focus is on understanding communication behavior as symbolic action, as constructive of social reality, and as a means for entry into cultural and subcultural group experience.

Prerequisite: *junior standing or permission of professor.*

HU 370

Advanced English Grammar (3,0)

3 Credits

This course introduces students to concepts of grammatical theory mainly at the level of syntax. Avoiding the niceties of linguistic distinctions, the course will introduce the student to useable concepts and terms that are also echoed in contemporary style checkers.

Prerequisite: *junior standing.*

HU 375

The Nature of Language (3,0)

3 Credits

This course provides a practical investigation into how people use language functions as a system of meaning. The diversity, complexity, and intrinsic fascination of this most human of behaviors is studied largely with reference to the English language. Topics include popular ideas about language, language and identity, language structure and system, language media, language acquisition and learning, language and the brain, and world languages.

Prerequisite: *COM 221 or COM 222.*

HU 415

Non-Verbal Communication (3,0)

3 Credits

This course entails the study of communication behaviors and processes, not involving the expression of written or spoken words, which contribute information to a message. Special attention is directed to the study of voice qualities; facial expression and body language; space, personal distance, and touch; the use of time and objects; and personal appearance. Study also involves nonverbal communication in applied settings, as well as research strategies for observing, measuring, and understanding non-verbal phenomena.

Prerequisites: *COM 219, equivalent Speech Communications course. (Also offered as COM 415. Students receive either Communication or Humanities credit, but not both.)*

HU 420

Applied Cross-Cultural Communication (3,0)

3 Credits

An examination of the challenges to communicating across the variety of subcultures present in work environments. Ethnicity, nationality, gender, physical impairment, and sexuality are among the areas of difference often present in business and professional environments that may influence the establishment of cooperative working relationships. Means for analyzing and developing strategies to transcend and make positive use of subcultural differences will be considered.

Prerequisites: *COM 219, COM 221.*

HU 475

Senior Thesis

3 Credits

As the culmination of the student's experience in the interdisciplinary Aerospace Studies program, this

Course Descriptions

course requires the student to complete documented research under the guidance of a faculty advisor, involving subject matter that is demonstrably tied to at least two of the student's three chosen minor fields of study. A series of seminar discussions or extended individual consultations with the faculty advisor may accompany the guided writing of the thesis.

HU 480

Senior Thesis Research (1,0)

1 Credit

Students will select a thesis committee and research problem, conduct appropriate research, and write and defend a thesis proposal and a full sentence outline. Course lectures will be integrated with faculty-guided workshops; topics include an overview of the thesis process, the development of a specific and contentious research problem, organization and format of the required thesis documents, citation standards, and appropriate academic language.

Prerequisite: *COM 221 or COM 222.*

HU 485

Senior Thesis Writing

2 Credits

Students using the work completed in HU 480, Senior Thesis Research, write their senior thesis in a workshop environment, defending the thesis at the end of the semester. Topics include problem-solution organization, documentation, argumentation, and successful presentation strategies.

Prerequisite: *HU 480.*

HU 299, 399, 499

Special Topics in Humanities

1-6 Credits

Individual independent or directed studies of selected topics in the humanities.

Prerequisites: *consent of instructor and approval of the department chair.*

Information Technology

IT 109

Introduction to Computers and Applications (3,0)

3 Credits

Introduction to computers and an overview of PC applications. Computer literacy is presented through lectures on the computer process, the impact of computers on society, emerging technologies, and how to make hardware and software purchasing decisions. A hands-on overview of the most popular computer applications such as word processing, spreadsheet, database, electronic mail, and Internet is provided.

Prerequisite: *proficiency in college preparatory mathematics.*

IT 210

Web Page Authoring and Design (3,0)

3 Credits

This course will address the organization of the Internet, addressing, routing, DNS, and use of Internet applications. It will review such applications as FTP, telnet, and advanced Web searching methodology. This course covers Web page authoring and design techniques using both HTML and WYSIWYG authoring software. Students will study, create, and refine Web pages online as well as create Web graphics. Lastly, legal and ethical issues related to the Internet and emerging technologies are discussed.

Prerequisite: *IT 109 or BA 120, or BA 221 or CS 223, or approval.*

IT 220

Introduction to Networking (3,0)

3 Credits

Introduction to networking covers each of the seven layers of the OSI reference model, MAC and IP addressing, identification of IP class addressing schemes including subnet masks, network wiring standards, and TCP/IP network layer protocols.

Prerequisite: *IT 109 or BA 120 or BA 221 or approval.*

IT 310

Web Site Management (3,0)

3 Credits

The course addresses effective Web site design including page layout, user interface design, graphic design, content flow, and site structure. Additionally, students will learn the optimal use of keywords and search engine positioning to maximize page exposure. Web site management including security and Intranet management will be discussed. The use of design standards and templates will teach students to emphasize site consistency. Students will design and create a major Web site with multiple pages and cross-linked structure.

Prerequisite: *IT 210.*

IT 320

Network Configurations (3,0)
3 Credits

Introduces the four router elements, configuration vehicles, user and privileged mode commands, configuring IP addresses, and monitoring/troubleshooting of router functions. More advanced topics include LAN switching theory, VLANs, LAN switched design, Novell IPX, and threaded case studies.

Prerequisite: *IT 220.*

IT 330

Programming for the Web (3,0)
3 Credits

This course introduces programming the Common Gateway Interface for Web pages using scripting languages. The emphasis is on the fundamentals of programming and creating interfaces to handle HTML form data. Students will create basic scripting programs with Web interfaces, learn to adapt existing code, and process data flows from online forms with basic database structures.

Prerequisite: *CS 118 or CS 223 or IT 210 or programming experience in a high-level language.*

IT 340

WAN Theory and Design (3,0)
3 Credits

WAN theory and design covers WAN technology, PPP, frame relay, ISDN. It further discusses network troubleshooting, national SCANS skills, and threaded case studies.

Prerequisite: *IT 320.*

Mathematics

MA 006

Intermediate Algebra (3,0)
3 Credits

An intermediate-level algebra course. Topics include fundamental concepts of algebra; linear equations and inequalities; polynomials; rational expressions; exponents and radicals; quadratic equations; functions and graphing; systems of linear equations; and inequalities. (Credit not applicable to any degree.)

MA 106

Basic Algebra and Trigonometry (3,0)
3 Credits

A study of the basic laws of fractions, exponents, radicals, inequalities, quadratic equations, complex numbers, and the elements of trigonometry.

MA 111

College Mathematics for Aviation I (3,0)
3 Credits

A pre-calculus course designed for the student of aviation. Review of the fundamentals of algebra; linear equations and inequalities; quadratic equations; variation; polynomial, rational, exponential, logarithmic, and trigonometric functions; radian measure; right triangle solutions, vectors, and the laws of sines and cosines.

Prerequisite: *MA 006, MA 106, or placement.*

MA 112

College Mathematics for Aviation II (3,0)
3 Credits

Basic calculus designed for the student of aviation. Differentiation and integration of algebraic functions; applications to velocity, acceleration, area, curve sketching, and computation of extreme values.

Prerequisite: *MA 111.*

MA 120

Quantitative Methods I (3,0)
3 Credits

An algebra methods course with applications to business and economics. Operations, relations, functions, modeling, and problem solving; systems of linear equations and inequalities.

Prerequisite: *MA 006 or placement.*

MA 140

College Algebra (3,0)
3 Credits

Fundamentals of exponents, radicals, linear, quadratic, and absolute value equations, inequalities, and complex numbers. Introduction to functions, curve sketching, elementary theory of equations, sequences and series, matrix algebra and systems of equations.

Prerequisite: *MA 006, MA 106, or placement.*

Course Descriptions

MA 142

Trigonometry (3,0)

3 Credits

Trigonometric functions and their graphs; identities; radian measure with applications; compound, half, and double angle identities; solving elementary trigonometric equations, right and oblique triangles; law of sines and cosines; exponential, logarithmic, and inverse trigonometric functions; vectors and trigonometric form of a complex number.

Prerequisite: *MA 006, MA 106, or placement.*
Corequisite: MA 140.

MA 145

College Algebra and Trigonometry (5,0)

5 Credits

Fundamentals of exponents, radicals, linear and quadratic equations, inequalities, elementary theory of equations, sequences and series, functions, exponential, logarithmic, and trigonometric functions, radian measure, trigonometric identities and equations, vectors, laws of sines, cosines, solutions of right triangles, and complex numbers.

Prerequisite: *MA 006, MA 106, or placement.*

MA 220

Quantitative Methods II (3,0)

3 Credits

An introduction to the methods and concepts of calculus with applications to business and economics; marginal functions, graphing, extreme values, and area problems. A brief introduction to descriptive statistics.

Prerequisite: *MA 111 or MA 120.*

MA 222

Business Statistics (3,0)

3 Credits

Measures of central tendency and dispersion; histograms; algebra of probability; sample spaces; dependent events; Bayes' Theorem with applications; binomial, Poisson, normal distributions, and their interrelationships; sampling distributions; hypothesis testing; confidence intervals.

Prerequisite: *MA 111 or MA 140.*

MA 241

Calculus and Analytical Geometry I (4,0)

4 Credits

Graphs and functions; limits and continuity; differentiation and integration of algebraic and elementary trigonometric functions; applications of first and second derivatives.

Prerequisite: *MA 140 or MA 145 or equivalent.*
Corequisite: MA 142.

MA 242

Calculus and Analytical Geometry II (4,0)

4 Credits

Differentiation and integration of transcendental functions; special integration techniques; polar coordinates; applications of the definite integral; numerical methods.

Prerequisite: *MA 241.*

MA 243

Calculus and Analytic Geometry III (4,0)

4 Credits

Solid analytic geometry; vector functions in three dimensions; elements of infinite series; partial differentiation; directional derivative and gradient; multiple integrals.

Prerequisite: *MA 242.*

MA 244

Combined Calculus (5,0)

5 Credits

Covers all the topics currently in MA 241 and MA 242.

Prerequisite: *One year of calculus.*

MA 245

Applied Differential Equations (3,0)

3 Credits

Applied treatment of ordinary differential equations; Laplace transforms; matrix algebra and applications; computer techniques; numerical methods; least squares fit; normal distribution and applications.

Prerequisites: *CS 210, MA 242. (Not for Bachelor of Science degree in Aerospace Engineering credit.)*

MA 320

Decision Mathematics (3,0)
3 Credits

The mathematical concepts and applications in mathematical model building and problem solving. Included are mathematical areas that are basic to decision theory.

Prerequisite: *MA 211 or MA 222. (Not open to engineering students.)*

MA 345

Differential Equations and Matrix Methods (4,0)
4 Credits

Treatment of ordinary differential equations to include principal types of first and second order equations; methods of substitution on simple higher order equations; linear equations and systems of linear equations with constant coefficients; methods of undetermined coefficients and variation of parameters; Laplace transforms; series solutions; linear algebra and matrix methods of solutions; applications to physics and engineering.

Prerequisite: *MA 243.*

MA 404

Statistics and Research Methods (3,0)
3 Credits

Elements of probability theory including finite probability spaces, conditional probabilities, independence, correlation, Bayes' Theorem, and Gaussian random variables. Statistical methods including contingency tables, regression, hypothesis testing. Experimental design. Ethical considerations in experimentation. Nonquantitative research methodologies. Numerical methods including the introduction of at least one computer-based statistics package.

MA 412

Probability and Statistics (3,0)
3 Credits

Finite sample spaces; conditional probability and Bayes' Theorem, discrete and continuous random variables and their functions; expected value, variance, and standard deviation; systematic study of the major discrete and continuous distributions; moment generating functions; hypothesis testing and estimation.

Prerequisite: *MA 242.*

MA 432

Linear Algebra (3,0)
3 Credits

Review of vector and matrix operations including matrix inverses, eigenvectors, and eigenvalues. Equations of lines and planes, vector spaces including basis and dimensions, linear transformations, change of basis, diagonalization of matrices, inner products and orthonormal bases, applications.

Prerequisite: *MA 245 or MA 345.*

MA 438

Numerical Analysis I (3,0)
3 Credits

Floating point arithmetic, error analysis, algorithms in interpolation, integration, differentiation, matrix algebra, approximation and solution of equations, use of numerical software packages.

Prerequisites: *CS 210 or CS 215, MA 245 or MA 345.*

MA 441

Advanced Engineering Mathematics I (3,0)
3 Credits

Line and surface integrals; vector fields with the study of Green, Gauss, and Stokes Theorems; applications of vector field theory; Fourier series.

Prerequisite: *MA 345.*

MA 442

Advanced Engineering Mathematics II (3,0)
3 Credits

The solution of linear differential equations with variable coefficients; study of the derivation, characteristics, and solutions of partial differential equations; Fourier series, Fourier transform, Laplace transform, and Green's function; applications in science and engineering.

Prerequisite: *MA 441.*

MA 443

Complex Variables (3,0)
3 Credits

Algebra of complex numbers; complex functions, analytic functions; mapping by elementary functions; conformal mappings and their applications; additional topics may include complex integration, power series expansion.

Prerequisite: *MA 441.*

Course Descriptions

MA 299, 399, 499

Special Topics in Mathematics

1-6 Credits

Individual independent or directed studies of selected topics in mathematics.

Prerequisites: *consent of instructor and approval of the department chair.*

Mechanical Engineering

ME 200

Machine Shop Laboratory (0,3)

1 Credit

Introduction to machine shop techniques to include familiarization with riveting, sheet metal forming, welding, and machining.

ME 300/L

Machine Design with Lab (4,1)

4 Credits

The mechanical design process. Materials in mechanical design. Working stresses and failure theories. Design of shafts, springs, screws, belts, clutches, and chains. Welded and riveted connections. Design of power transmission. Design of Spur, helical, bevel, and worm gears. Lubrication and design of bearings.

Prerequisites: *ES 202 and ES 204, or approval of the instructor.*

ME 302

Introduction to Robotics (3,0)

3 Credits

This course is an introduction to robotics with emphasis on the mathematical tools for kinematics and dynamics of robot arms. Topics include the geometry and mathematical representation of rigid body motion; forward and inverse kinematics of articulated mechanical arms; trajectory generation, splines, interpolation; manipulator dynamics; position sensing and actuation; and topics in manipulator control. Coursework includes weekly problem sets and computational laboratories (using the Matlab numerical programming environment), a mid-term examination, and a final examination.

Prerequisite: *ES 204. Corequisites: AE 430, or EE 401/402.*

ME 303

High-Performance Vehicles (3,0)

3 Credits

This course covers design considerations for high-performance vehicles such as competition automobiles and high-speed mass transit vehicles. Considered are propulsion, aerodynamics, stability, down force enhancement systems, braking and handling. Engines for various vehicles are compared, such as the conventional internal combustion engine, the rotary or Wankel, for competition applications and long life requirements such as traction engines for rail applications. Also investigated are crash safety issues for both mass transit and competition. Guided vehicles such as mass transit trains and the Intelligent Transportation System (ITS) are investigated. Future technologies such as magnetically levitated and very high-speed mass transit systems are analyzed.

Prerequisites: *ES 202, ES 204, and ES 305, or consent of the instructor.*

ME 400

Vibration & Acoustics (3,0)

3 Credits

Basic concepts of vibration; free and undamped vibration; energy methods and Rayleigh's method for determination of natural frequencies; viscously damped vibration; various damping mechanisms; torsional vibration; harmonically excited vibration; transient vibration; multi degrees of freedom systems; rotor dynamics; basic principals of acoustics and wave propagation; electroacoustics; transducers, noise measurements; applications to land, airborne, and space vehicle acoustics generated by a structure's vibration or by aerodynamic sources.

Prerequisites: *MA 345, ES 202 and ES 204, or approval of the instructor.*

ME 403

Thermal Power Systems (3,0)

3 Credits

Availability and evaluation of thermodynamic properties. The thermodynamics of compressible flow. Thermodynamic power and refrigeration cycles and systems; psychometrics and environmental control; mixtures of ideal gases; introduction to combustion; internal combustions engines, gas turbines, fuel cells; and direct energy conversion. Design and optimization of power systems and climate control with applications to land vehicles, robotics, aircraft, and spacecraft.

Prerequisites: *ES 305, MA 345.*

ME 406

Robotics II (3,0)

3 Credits

This course studies the applications and design of robotic systems. Particular emphasis is placed on aviation and space applications of robotics. Typical robotic motion is investigated and the requirements for control systems for the needed accuracy, repeatability, and stability is investigated. Sensors such as position, force, and acceleration are explored and the signal conditioning circuits and analog-to-digital conversion required interfacing these sensors. Activating devices such as electric motors, linear actuators, and other motion devices are analyzed. Systems are modeled and control laws are developed. Software for computer-generated control laws are studied.

Prerequisite: *ME 302.*

ME 409

High-Performance Land Vehicles II (3,0)

3 Credits

Aerodynamic forces on land vehicles. Design requirements for lift, drag, stability, and safety for passenger. Cars, high-performance vehicles, commercial, and motorcycles. Noise control, heating, ventilation, and air conditioning. Engines for various vehicles are compared (such as the conventional internal combustion engine, the rotary or Wankel), for competition applications and long life requirements such as traction engines for rail applications. Fuels and combustion, exhaust flows, emission and air pollution, fuel cells systems, hybrid vehicles. Ideas from aerospace technologies are implemented, such as jet engines for powering vehicles and the use of computational fluid dynamics codes to predict the aerodynamic performance of such vehicles. Also, future technologies such as magnetically levitated and very high-speed mass transit systems are analyzed.

Prerequisites: *ES 201, ES 204, ES 206, ES 305.*

ME 412

Mechanical Engineering Senior Project (4,0)

4 Credits

Mechanical conceptual design principles for aerospace applications are developed to meet modern performance specifications. A complete system is designed, resulting in a design package consisting of specifications, analysis calculations, drawings, and complete performance report. Principles of conceptual and detailed mechanical design and component design, manufacture, and production are covered along with projects to give actual experience in the design of components. Carries the design of a system from the general layout to the design of its detail parts and the design of necessary tools. A topic is selected and approved in mechanical engineering under the direction of a faculty member in the ME department. The student will submit a final written and oral report. For senior undergraduate students only.

ME 415

Modeling and Numerical Simulations of Energy and Environmental Systems (3,0)

3 Credits

The course introduces students to the basic methods of numerical modeling for typical physical problems encountered in solid mechanics, thermal/fluid sciences, energy, and environmental systems. Students will learn how to formulate a model in terms of algebraic or differential equation. Problems that can be solved analytically will be chosen initially and solutions will be obtained by appropriate discrete methods. Basic concepts in numerical methods, such as convergence, stability, and accuracy, will be introduced. Various computational tools will then be applied to more complex problems, with emphasis on finite element and finite difference methods, finite volume techniques, boundary element methods, and gridless Lagrangian methods. Methods of modeling convective nonlinearities, such as upwind differencing and the Simpler method, will be introduced. Discussion and structural mechanics, internal and external fluid flows, and conduction and convection heat transfer. Steady state, transient, and eigenvalue problems will be addressed with emphasis on aerospace power and environmental systems.

ME 421

Clean Energy Systems (3,0)

3 Credits

This course will emphasize energy systems for both stationary and transportation applications. General energy requirements will be discussed for industrialized societies and the effects of waste energy and undesired byproducts. Clean energy process and minimizing the environmental effects. Examples of energy systems to be considered are fuel cells, wind energy, wave energy, geothermal energy, and solar energy.

ME 425

Micro-Electrical-Mechanical Systems (3,0)

3 Credits

Scaling of micro-mechanical devices. Mechanical properties of MEMs materials. Flow physics. MEMs fabrication. Inertial sensors. Surface micro-mechanical

Course Descriptions

mechanisms. Micro-robotics. The focused areas will include nano-structured materials (particularly nano-composites and multifunctional nano-materials), nano-fabrication, infrared and night vision system, and micro-crafts.

Prerequisites: *senior standing in an engineering program.*

ME 428

Design for Manufacturing and Assembly (3,0)

3 Credits

Manufacturing processes and life cycle design for the aerospace industry. Tolerances and materials properties. Design for manufacturing and associated costs for various manufacturing processes (machining, casting, molding, stamping, forming, forging, and extrusion) with aviation-related case studies. Design for product assembly and total assembly cost with case studies. Selection of materials and processes using design for manufacturing guidelines, standards, and tolerance fittings. Simulations using computer graphics software. Design for manufacturing course project.

Prerequisites: *ME 300, MA 345, MA 412, and junior or senior status.*

Military Science Army ROTC

MSL 101

Basic Military Science I (1,0)

1 Credit

A study of the defense establishment and the organization and development of the U.S. Army. A study of the roles the active Army forces, the Army Reserve Forces and the Army National Guard play in our nation's defense. A study of the military courtesy, customs, and traditions of the service. A historical perspective of the role of the different branches of the U.S. Army and the role they have played in the freedom of our nation. An introduction to physical readiness training. Course includes lectures and laboratory. Field training exercises normally include M16-A1 rifle firing, rappelling training, and airmobile helicopter operations. Corequisite: MY 103 Laboratory.

MSL 101L

Basic Military Science I Laboratory (0,1.5)

0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training is introductory in scope and includes operations and tactics and land navigation subjects. Practical training exercises familiarize students with the field environment and field survival skills. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 102

Basic Military Science II (1,0)

1 Credit

Continued emphasis on physical readiness training. Course includes lecture and laboratory. Field training exercises normally include M16-A1 rifle firing, rappelling training, and airmobile helicopter operations. Corequisite: MY 104 Laboratory.

MSL 102L

Basic Military Science II Laboratory (0,1.5)

0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training continues the leader development process while remaining introductory in scope and develops basic operations and tactics and land navigation skills acquired in MY 103 Laboratory. Practical training exercises continue cadet field orientation with the focus on individual training. Special topics, including stream-crossing techniques, field survival skills, and bivouac techniques, are covered. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 201

Basic Military Leadership I (1,0)

2 Credits

A review of the customs and traditions of the service. The fundamentals of leadership development and the importance of understanding the principles that are important to effective leadership. This includes focus on goal setting, communication, problem solving, decision making, and group process. The course requires mandatory physical training and includes lecture and laboratory. Corequisite: MY 203 Laboratory.

MSL 201L

Basic Military Leadership I Laboratory (0,1.5)

0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training continues the development of cadet leadership and critical skills while remaining basic in scope and includes operations and tactics, land navigation, first aid, and general military subjects. Practical training exercises stress development of basic skills with the focus on soldier-team development at the squad/team level. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 202

Basic Military Leadership II (1,0)
2 Credits

The fundamentals of military geography and their application in the use of navigational aids for the military forces. A study of preventive medicine countermeasures and first-aid techniques that every leader must know. The course requires mandatory physical training and includes both lecture and leadership laboratory. Two weekend training exercises normally include M16-A1 rifle firing, rappelling training, and airmobile helicopter operations. Corequisite: MY 204 Laboratory.

MSL 202L

Basic Military Leadership II Laboratory (0.1.5)
0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences, strong focus on ethics, communication skills, time management, and leadership values. Training continues basic skills acquired in MY 203 Laboratory and includes operations and tactics and land navigation. Practical training exercises continue development of basic skills with the focus on soldier-team development at the squad/team level. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 301

Officership I (3,0)
3 Credits

This course examines the foundations of officership, and the character, responsibilities, and status of being a commissioned officer. It is dynamic, challenging, and stressful, for it is the course that emphasizes the warrior ethic. The course covers a wide spectrum of subjects, from training in common military skills to fostering a value system that emphasizes service to the nation, readiness to persevere in the face of obstacles, and willingness to make personal sacrifices in pursuit of the greater good. This course includes lecture, advanced leadership laboratory, physical training, and practical field training exercises.

Prerequisites: *completed basic military science (or given constructive credit) and be a contracted Army ROTC cadet. Corequisite: MY 303 Laboratory.*

MSL 301L

Officership I Laboratory (0,2.5)
0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training continues development of cadet competencies and confidence through intermediate leadership and technical/tactical instruction. Practical training exercises are supplementary in scope and include operations and tactics, land navigation, and weapons training. Special topics including tactical bivouac techniques, individual tactical techniques, tactical foot march techniques, squad tactics, and small unit patrolling are covered. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 302

Officership II (3,0)
3 Credits

A continuing development of the processes that distinguish commissioned military service from other professional endeavors. The main emphasis of this class will be the preparation of cadets for the six-week advanced camp they normally attend at the end of the junior year. Here their capability to conceptualize, innovate, synthesize information, and make sound decisions while under stress will be evaluated. This course includes lecture, advanced leadership laboratory, enhanced physical training, and practical field training exercises.

Prerequisite: *MY 303. Corequisite: MY 304 Laboratory.*

MSL 302L

Officership II Laboratory (0,2.5)
0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training continues development of intermediate leader and critical skills in preparation for Advanced Camp. Practical training exercises focus on soldier-team development at squad/patrol level. Training is supplementary and includes tactics, land navigation, and weapons subjects. Special topics include tactical bivouac techniques, small unit patrolling, a mini-STRAC exercise, and drownproofing. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

Course Descriptions

MSL 401

Advanced Military Leadership I (3,0)

3 Credits

A study of military professionalism with emphasis on command and staff relationships, organizational functions, and duties of various staff officers who assist in the leadership of the organization. A study of personnel and logistical systems and the role they play in helping the organization optimize operations and improve life in the Army community. Training in staff briefings will be used as an introduction to military procedures. This course includes lecture, laboratory, and physical readiness training. Corequisite: MY 403 Laboratory.

MSL 401L

Advanced Military Leadership I Laboratory (0,2.5)

0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training culminates the leader development process at the pre-commissioning level. Training is supplementary and includes operations and tactics, land navigation, and radio wire communication subjects. Students perform as subject matter experts and are responsible for conducting and evaluating training. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 402

Advanced Military Leadership II (3,0)

3 Credits

A study of ethics and professionalism in the military and the role they play in carrying out the defense policy of the United States. The fundamentals of military law, its impact on the American military society, and its place in the jurisdictional system. A history of the military courts martial as it relates to the jurisdictional process of American society. A study of the Law of Land Warfare and its relationship to the conduct of soldiers in combat. This course includes lecture, laboratory, and physical readiness training. Corequisite: MY 404 Laboratory.

MSL 402L

Advanced Military Leadership II Laboratory (0,2.5)

0 Credit

Leadership laboratory with emphasis on military leadership and small unit tactics. Students develop leadership abilities through hands-on practical experiences. Training culminates development of leader skills emphasizing the transition from cadet to second lieutenant. Expands the frame of reference and gradually shifts it to orient on future assignments as an officer. Training is supplementary and includes operations and tactics, land navigation, and radio wire communication subjects. Students perform as subject matter experts and are responsible for conducting and evaluating training. The Army Physical Fitness Test (APFT) is administered to assess the state of physical development.

MSL 199-499

Special Topics in Military Science (3,0)

1-3 Credits

Individual independent or directed studies of selected topics in general military science.

Prerequisites: *Consent of instructor and approval of professor of military science.*

Naval Science

NSC 100

Naval Science Lab

0 Credit

Military drill, cruise preparation, customs, traditions and special areas of knowledge required of commissioned officers in the Navy and Marine Corps. Required for all midshipmen.

NSC 101

Introduction to Naval Science (2,0)

2 Credits

Introduction to the naval service with emphasis on the mission, organization, regulations, and components of the Navy and Marine Corps. Must be completed during the freshman year. Required for all midshipmen.

NSC 102

Seapower and Maritime Affairs (3,0)

3 Credits

This course provides an understanding of the significance of sea power throughout history from the Phoenicians to the post-Cold War era and the War on Terrorism. Included is discussion of how naval forces constitute a vital component in promoting the national interests, policies, and overall military strategy of the United States Midshipmen with the exception of Nurse Corps options are required to take this course in the spring of the first year. Nurse Corps option midshipmen may take the course during their second year.

NSC 201

Principles of Naval Leadership and Management (3,0)

3 Credits

Theory and principles of management, focusing on the officer-manager as an organizational decision maker. Includes interpersonal skills behavior factors, and group dynamics. Required for all midshipmen.

Prerequisite: *NSC 100.*

NSC 202

Navigation (3,0)

3 Credits

This course provides a comprehensive study of ship navigation theory, principles, and procedures. Included is coverage of the international and inland rules for navigation, celestial and electronic navigation, piloting, dead reckoning, tides, weather, and use of navigational equipment, publications, and charts. Midshipmen with the exception of Nurse Corps and Marine Corps options are required to take this course. Corequisite: NSC 202L.

NSC 202L

Navigation Laboratory

1 Credit

Laboratory work in piloting and celestial navigation to complement Naval Science 202. One hour per week. Required for all Navy option midshipmen. Not required for Nurse Corps and Marine option midshipmen. (Fall term only.)

NSC 301

Naval Engineering (3,0)

3 Credits

Naval ship systems to include hydrodynamic forces, stability, compartmentalization, electrical, and auxiliary systems. Theory and design of steam, gas turbine, and nuclear propulsion. Shipboard safety and firefighting.

Prerequisites: *MA 111 or higher and PS 103. Required for Navy option midshipmen; not required for Nurse Corps and Marine option midshipmen.*

NSC 302

Naval Weapons Systems (3,0)

3 Credits

An introduction to the theory of weapons systems through the study of the fundamental principles of sensor, tracking, computational, and weapons delivery subsystems. Explosives, fusing, and naval ordnance. Required for all Navy option midshipmen. Not required for Nurse Corps or Marine option midshipmen.

NSC 310

Evolution of Warfare (3,0)

3 Credits

Survey of military history emphasizing principles of warfare, strategy and tactics, and significant military leaders and organizations. May be taken in the sophomore or junior year. Required for all Marine Corps option midshipmen. Not required for Navy option or Nurse Corps midshipmen.

NSC 311

Amphibious Warfare (3,0)

3 Credits

The history of amphibious warfare emphasizing doctrine and techniques. May be taken in the junior or senior year. Required for all Marine Corps midshipmen.

NSC 401

Naval Operations & Seamanship (3,0)

3 Credits

This course provides an understanding of organizational interrelationships between authority, responsibility, and accountability, the concept of naval command and control, and concepts and philosophies of joint operations. Included is the study of ship handling, relative motion, basic forms of naval communications, and U.S. and adversarial weapons systems and platforms. Midshipmen with the exception of Nurse Corps and Marine Corps options are required to take this course. (Spring term only.) Corequisite: NSC 401L

NSC 401L

Naval Operations and Seamanship Laboratory

1 Credit

Laboratory work in maneuvering board (vector analysis) and communications, and conflict resolution to complement NSC 401. One hour per week. Required for all Navy option midshipmen. Not required for Nurse Corps and Marine option midshipmen.

NSC 402

Principles of Naval Management II/ Leadership and Ethics (3,0)

3 Credits

Integration of professional competencies and qualities of effective leadership with emphasis on moral and ethical responsibilities, accountability, communications, and military law for the junior officer. Required for all midshipmen.

Physical Science

PS 101

Basic Chemistry (3,1.5)
3 Credits

Elementary chemical theory. Covers basic atomic theory, elements, compounds, and mixtures, calculation of weight and weight volume relationships, and basic descriptive chemistry. One 1.5-hour laboratory session per week. (Cannot be used for credit in chemistry toward a degree in Aerospace Engineering.) Passing grade required for Lab. Students who take PS 108 may not also take PS 101.

Prerequisite: *MA 111 or corequisite: MA 140.*

PS 102

Explorations in Physics (3,0)
3 Credits

Survey course in elementary physics. Stress will be placed on basic concepts, principles, and history of the development of physics. Presentations will include selected topics in mechanics, heat, light, sound, electricity and magnetism, and modern physics. (Cannot be used for credit in physics toward degrees in Computer Science, Engineering Physics, Civil, Aerospace, or Electrical Engineering, or Aeronautical Science.)

Prerequisite: *MA 111.*

PS 103

Technical Physics I (3,0)
3 Credits

A course in elementary physics. Stress will be placed on basic physics principles. Problem solving and problem-solving logic will be an important, integral part of this course. Topics will include Newton's Laws, projectile motion, circular motion, work, energy, conservation laws, momentum. (Cannot be used for credit in physics toward degrees in Computer Science, Engineering Physics, Civil, Aerospace, or Electrical Engineering.)

Prerequisite: *MA 111 or MA 140. Corequisite: MA 112 or MA 241. Corequisite: PS 103L.*

PS 103L

Technical Physics I Laboratory (0,1)
0 Credit

Techniques for data analysis and laboratory methods in the context of experiments dealing with Newton's laws, energy, and rotational motion. This laboratory is designed to complement PS 103. Corequisite: PS 103.

PS 104

Technical Physics II (3,0)
3 Credits

Application of basic physics principles discussed in PS 103. Other areas will include fluids, properties of matter, thermodynamics, wave motion, sound, simple harmonic motion, kinetic theory, basic electromagnetic theory, and elementary circuits. (Cannot be used for credit in physics toward degrees in Computer Science, Engineering Physics, Civil, Aerospace, or Electrical Engineering.)

Prerequisites: *PS 103, MA 112, or MA 241. Corequisite: PS 104L.*

PS 104L

Technical Physics II Laboratory (0,1)
0 Credit

Techniques for data analysis and laboratory methods in the context of experiments dealing with oscillatory motion, sound, heat, fluids, and electricity. This laboratory is designed to complement PS 104. Corequisite: PS 104.

PS 105

General Chemistry I (3,3)
4 Credits

Fundamental principles of chemistry that include nomenclature, stoichiometry, atomic structure, periodic relationships, chemical bonding, geometry of molecules, properties of gases, solutions, and an introduction to organic chemistry. Laboratory includes both descriptive and quantitative work.

Prerequisites: *One year of high school chemistry or PS 101, and MA 140 or its equivalent.*

PS 106

General Chemistry II (3,3)
4 Credits

Chemical principles that include thermodynamics, acids and bases, rates of reaction, electrochemistry, organic chemistry, synthetic materials.

Prerequisite: *PS 105.*

PS 107

Elements of Biological Science (3,0)
3 Credits

A physical science course with emphasis on anatomy and physiology of man including chemical and cellular basis of life, biology of organisms, and ecology.

PS 108

Contemporary Chemistry (3,1)
3 Credits

Elementary chemical theory. The origins and development of chemistry with an overview of the present applications of chemistry and its future potential in human affairs. Applications to scientific decision-making in the business and industrial environment. One one-hour laboratory session per week. Students who take PS 108 may not also take PS 101.

PS 111

Plant Biology (3,3)
4 Credits

This course will study principles and processes associated with the biology of plants, including survey of fungi, green protista, and plants. Major emphasis on vascular plants, evolutionary origins, and ecological adaptations. One three-hour laboratory session per week.

PS 112

Animal Biology (3,3)
4 Credits

This course will study principles and processes found in the animal kingdom, including survey of the major animal groups. Major emphasis on structure, diversity, phylogeny, and ecological adaptations. One three-hour laboratory session per week.

PS 140

Chemistry for Engineers (4,0)
4 Credits

Chemical stoichiometry, states of matter, solutions, thermodynamics, rate of reaction, equilibrium, oxidation-reduction, corrosion, organic compounds, and polymers.

Prerequisites: *High school chemistry or PS 101. Corequisite: PS 141.*

PS 141

Chemistry for Engineers Laboratory (0,3)
1 Credit

One three-hour laboratory session per week, with experiments paralleling the material of PS 140. Corequisite: PS 140.

PS 142

Introduction to Environmental Science (3,0)
3 Credits

An introductory course that stresses the interrelations of all aspects of the living and the nonliving world. Introduces the student to key concepts and principles that govern how nature works and the application of these concepts and principles to possible solutions to environmental and resource problems.

PS 150

Physics for Engineers I (3,0)
3 Credits

Vectors and scalar quantities, geometrical optics, kinematics, Newton's Laws of Motion, work, work-energy, conservation of energy, conservation of momentum, center of mass and its motion. Corequisite: MA 241.

PS 160

Physics for Engineers II (3,0)
3 Credits

Special theory of relativity, rotational motion, simple harmonic motion, waves, fluids, heat, kinetic theory, thermodynamics.

Prerequisite: *PS 150. Corequisite: MA 242.*

PS 208

Physics II (3,0)
3 Credits

Fluids, temperature, heat, first and second laws of thermodynamics, wave motion, acoustics.

Prerequisites: *MA 242, PS 215, PS 216. Corequisite: MA 243.*

PS 210

Physics II Laboratory (0,3)
1 Credit

One three-hour laboratory session per week with experiments chosen primarily from wave motion, transverse and longitudinal waves, superposition of waves, traveling waves, and standing waves.

Course Descriptions

PS 215

Physics I (3,0)

3 Credits

Estimations, order of magnitude analysis, Newton's Law, gravitation, kinematics, work and energy, momentum, rotation, harmonic motion.

Prerequisite: *MA 241. Corequisites: MA 242, PS 216.*

PS 216

Physics I Laboratory (0,3)

1 Credit

One three-hour laboratory session per week, with experiments chosen primarily from mechanics. Corequisite: PS 215.

PS 219

Physics III (3,0)

3 Credits

Static electricity, Gauss's Law, potential, Ohm's Law, direct current circuits, magnetic fields, induced electromotive force, inductance, EM waves, the nature of light, images formed by mirrors and lenses and optical instruments.

Prerequisites: MA 243, PS 208. Corequisite: PS 220.

PS 220

Physics III Laboratory (0,3)

1 Credit

One three-hour laboratory session per week with experiments chosen primarily from thermodynamics, electricity and magnetism, and geometric optics.

Prerequisites: *MA 243 and PS 208. Corequisite: PS 219.*

PS 240

Natural History of the Region (3,3)

4 Credits

This course focuses on the geology, paleohistory, flora, fauna, and ecosystems of the region. The course covers such topics as the relationship between slope, elevation, topography, and plant communities.

PS 250

Physics III for Engineers (3,0)

3 Credits

Gravitational fields, electric fields and magnetic fields, Gauss's law, electric potential, linear accelerators, cyclotrons, capacitors, Ohm's law, Kirchoff's laws, Ampere's law, Faraday's law, Lenz's law, Maxwell equations, selected topics from modern physics.

Prerequisites: *MA 242, PS 160.*

PS 253

Physics Laboratory for Engineers (0,3)

1 Credit

One three-hour session per week. Experiments will vary from semester to semester, but will be chosen from laboratory report writing workshop, error analysis, damped harmonic oscillations, spectrometers, optics, fiber optics, atomic physics, thermodynamics, and R-C circuit theory. Corequisite: PS 250.

PS 290

Physics Laboratory Practicum (0,1)

0 Credit

Required, noncredit course. Requires the student to direct the operation of a basic laboratory for one semester. Includes laboratory preparation, laboratory discussion, and grading of laboratory reports.

Prerequisite: *COM 219.*

PS 301

Astronomy (3,0)

3 Credits

A descriptive course dealing with the structure and evolution of the physical universe. Topics include the solar system (Earth, Moon, Sun, and planets), stars, black holes, galaxies, quasars, cosmology, and exobiology. Planetarium trips and night observing sessions optional.

Prerequisite: *PS 102 or PS 103 or PS 150 or PS 215.*

PS 302

Evolution of Scientific Thought (3,0)

3 Credits

Traces the development of science from the earliest times through the modern period, with particular emphasis given to our changing concepts of nature and of science itself. (Also offered as SS 302. Students receive either Social Sciences elective credit or Physical Sciences elective credit, but not both.)

Prerequisites: *Either HU 140 or HU 141 or HU 142 and either PS 101 or PS 102 or PS 103 or PS 150 or PS 215.*

PS 303

Modern Physics (3,0)

3 Credits

Modern concepts in physics including optics. Topics include refraction, diffraction, and scattering of electromagnetic radiation, special relativity, wave-particle duality, the uncertainty principle, quantum theory of atomic structure, X-rays, lasers, and nuclear reactions.

Prerequisites: *PS 219 and PS 220.*

PS 304

Environmental Science (3,0)
3 Credits

A survey course in the environmental problems arising from man's use and abuse of his environment. Ecological, economic, sociologic, and technologic principles will be applied to the management control of pollution of the atmosphere and water sources of the Earth.

Prerequisites: *PS 101 or PS 140 and PS 141.*

PS 305

Modern Physics Laboratory (0,3)
1 Credit

Experiments in atomic and nuclear physics, including spectroscopy, nuclear particle analysis, X-ray analysis, and laser applications. Corequisite: PS 303.

PS 306

Consumer and Hazardous Waste (3,0)
3 Credits

Introduction to sources, characteristics, and concerns of hazardous materials in environmental systems. Examination of general approaches toward site assessment, risk analysis, site remediation, and other issues pertinent to hazardous waste management. Development of environmental literacy is emphasized.

Prerequisite: *One year of high school chemistry or concurrent enrollment in PS 105 or PS 106.*

PS 308

Atmospheric Environmental Studies (3,0)
3 Credits

Overview of atmospheric environmental topics on local and regional issues as well as global change issues. Introduction to the chemistry of atmospheric pollution. Examination of sources of air pollution especially from the aerospace industries. Includes discussion of monitoring, regulation, and control of air pollution.

Prerequisites: *PS 108 or equivalent, PS 142, or permission of instructor.*

PS 309

Principles of Ecology (2,3)
3 Credits

This course is designed to provide practical experience in the scientific measurement of environmental parameters. Experience in collecting and identifying plants and animals in the different ecosystems will be developed by field and laboratory work.

Prerequisites: *PS 107, PS 108, or equivalent (PS 101 or PS 140), and PS 142, or permission of instructor.*

PS 310

Air Quality and Sound Pollution (3,0)
3 Credits

The examination of the fundamental principles that govern air quality, its pollution, and its management. Also the fundamental principles associated with sound pollution and its management.

Prerequisites: *PS 105, PS 106, PS 142, and WX 201.*

PS 311

Water Quality (3,0)
3 Credits

The hydrologic cycle, with emphasis on atmospheric, land surface, shallow subsurface, and groundwater processes. Examination of physical, chemical, and biological properties of these aquatic systems and the effects of common pollutants. Development of environmental literacy is emphasized.

Prerequisites: *PS 105, PS 106, and PS 142.*

PS 312

Plant Identification (2,3)
3 Credits

This course is designed to provide practical experience in identification of local flowering plants through the use of regional floras and recognition of common plant families. Elements of plant collection, identification, and herbarium techniques will be taught through classroom lectures and field and lab work. Students will be required to prepare their own plant collection.

Prerequisite: *PS 111.*

PS 313

Riparian Ecology (2,3)
3 Credits

The analysis of the structure, function, and classification of riparian habitats with special emphasis on Southwestern waterways. Evaluation of limnological, floral, and geomorphic resources that create specific riparian habitats will be covered.

Course Descriptions

PS 320

Classical Mechanics (3,0)
3 Credits

Fundamentals of mechanics, oscillatory motion, systems of particles, varying mass, motion under central forces, motion in three dimensions, gyroscopic motion, generalized coordinates, normal coordinates, Lagrangian and Hamiltonian formulations. Students will write some simple computer programs.

Prerequisites: *ES 204, MA 345, PS 219. Corequisite: PS 303.*

PS 400

Senior Physics Laboratory I (2,3)
3 Credits

Study of geometrical and physical optics including plane waves, mirrors, lenses, emission and absorption line spectroscopy, diffraction gratings, lasers and interferometers.

Prerequisite: *PS 305.*

PS 401

Astrophysics (3,0)
3 Credits

Study of the basic physical processes operating in the astronomical environment, stellar structure and evolution, the interstellar medium, galaxies, and cosmology. Astrophysical concepts are emphasized, thus underlining the common features operating in many astronomical systems.

Prerequisites: *MA 345, PS 303.*

PS 402

Environmental Quality Laboratory (0,3)
1 Credit

A laboratory course using field techniques and equipment commonly found in environmental workplace. Projects and demonstrations will use local flight-line and airport municipalities as examples.

Prerequisites: *PS 306 and PS 310.*

PS 403

Wildlife and Airports (3,0)
3 Credits

An examination of the problems and solutions associated with wildlife and their impact on airport safety. Special emphasis on problems correlated with birds. Prerequisite: PS 309.

PS 405

Atomic/Nuclear Physics (3,0)
3 Credits

Multi-electron atoms, X-rays and gamma rays, radiative transitions in the atom and the nucleus. Basic properties of nuclei, systematics of nuclear stability, dynamics of nuclear reactions, nuclear models, and nuclear forces. Introduction to particle physics and its applications to cosmic rays, stellar energy, and the formation of the elements.

Prerequisite: *EP 455.*

PS 408

Astrophysics II (3,0)
3 Credits

Radiative transfer in astrophysical environments; stellar atmospheres, stellar interiors, and gaseous nebulae. Emission and absorption processes. Interaction of radiation with matter.

Prerequisites: *MA 345, PS 401.*

PS 410

Senior Physics Laboratory IIa (2,3)
3 Credits

Binary stars, spectroscopic binaries, proper motion, galaxy rotation curves, image processing.

Prerequisites: *PS 400, PS 401.*

PS 412

Particle Physics and Cosmology (3,0)
3 Credits

Study of the evolution of the universe including large-scale structure, Big-Bang cosmology, general relativity, and the search for dark matter.

Prerequisites: *MA 441, PS 405.*

PS 414

Senior Physics Laboratory IIb (2,3)
3 Credits

Measurements of nuclear and particle systems using high-precision detectors and high-speed data acquisition.

Prerequisites: *PS 303, PS 305, PS 400.*

PS 199, 299, 399, 499

Special Topics in Physical Science
1-4 Credits

Individual independent or directed study of topics in the fields of the physical sciences impinging on aerospace development or practices that are of current or anticipated interest.

Prerequisites: consent of instructor and approval of the department chair.

Psychology

PSY 220

Introduction to Psychology (3,0)
3 Credits

A survey of the biopsychosocial continuum and the intrapsychic, interpersonal, and organizational factors affecting human behavior. A primary feature of the course is its focus on the scientific method as the route to psychological knowledge. Students study the rationalist, empiricist, and experimental foundations of the scientific method and how these foundations can be critiqued. Topics include sensation, perception, learning, memory, personality, psychopathology, physiological psychology, and social processes. Emphasis is placed on the application of the basic principles of psychology to engineering, aviation, public policy, and business.

PSY 225

Research Analysis in Psychology (3,2)
4 Credits

This course is an elementary program in data analysis and statistics. The focus is on basic statistical concepts for the social sciences. Although computer data analysis is a component of the course, it is secondary to statistical theory and computational procedures. The body of the course covers parametric procedures including t-tests, analysis of variance, corelational techniques, descriptive statistics, and frequency distributions. Some attention is devoted to nonparametric analysis. The emphasis is on decisions to choose the appropriate statistical technique and computational work. Statistical computations using computer software will be covered. Data setup and analysis, as well as graph generation and statistical output interpretation will be focused on.

Prerequisites: *MA 111 or MA 140, PSY 220.*

PSY 300

Research Design in Psychology (3,0)
3 Credits

This course is an elementary program in research design. The course focuses on the development of research designs, surveys, scaling techniques, field studies, case study data designs, and techniques commonly used in the social sciences and human factors. Considerable attention is devoted to designing experiments. Concepts in controlling, manipulating, and measuring dependent and independent variables, sampling techniques, generalization, construct and content validity, reliability, issues in confounding and counterbalancing measures, restriction in range problems, practice effects, order effects, inter-rater and intra-rater reliability, error variance, sampling error, pre-test/post-test designs, and ethical concerns form the basis of the course. Corequisite: PSY 225.

PSY 305

Experimental Psychology (2,1)
3 Credits

An advanced research design course focusing on the experimental and quantitative methods used by psychologists to acquire knowledge and to determine the reliability and validity of research data. The course incorporates direct experience in the laboratory with the methods of data collection and analysis and the description of research findings.

Prerequisite: *PSY 300.*

PSY 310

Sensation and Perception (2,1)
3 Credits

How organisms sense and perceive the environment. Topics discussed include types of stimuli affecting the sensory receptors, the anatomy and physiology of the sensory systems responding to those stimuli, and current knowledge and theories about perceptual abilities. Laboratory/research experience is included. The laboratory will include experimental investigations and demonstrations of sensory and perceptual phenomena. Vision, audition, taste, smell, the skin senses, and balance will be included.

Prerequisite: *PSY 220.*

PSY 315

Cognitive Psychology (3,0)
3 Credits

Contemporary theories of human information processing. Major topics include attention, mental representations, categorization, short-term and long-term memory, psycholinguistics, reasoning, problem-solving, judgment, and decision making.

Prerequisite: *PSY 220.*

PSY 320

Aviation Psychology (3,0)
3 Credits

A study of the complexities of human factors research in aviation. Drawing extensively on such diverse areas as human physiology, basic learning theory,

Course Descriptions

aviation safety, and pilot training. The course surveys the study of human behavior as it relates to the aviator's adaption to the flight environment.

Prerequisite: *PSY 220.*

PSY 325

Group Structure and Process (3,0)

3 Credits

An examination, at an advanced level, of situational and individual determinants of social structure and interaction in face-to-face groups. Various theories of exchange, equity, power, and leadership are considered.

Prerequisite: *PSY 220.*

PSY 330

Learning and Motivation (3,0)

3 Credits

This course explores elementary learning processes and how they combine with complex cognitive, motivational, and social factors to influence what organisms do.

Prerequisite: *PSY 220.*

PSY 335

Physiological Psychology (2,1)

3 Credits

A study of the neural and biochemical bases of behavior with special emphasis on sensory processing, motivation, emotion, learning, and memory. Both experimental analysis and clinical implications are considered. Activities are conducted on the anatomy and physiology of the nervous system, and on the development, evolution, and function of behavior.

Prerequisite: *PSY 220.*

PSY 340

Industrial-Organizational Psychology (3,0)

3 Credits

A survey of major topics in industrial-organizational psychology, with emphasis on organizational and personnel psychology applied to business, industry, and government. An examination and critical review of theories and research in selected areas of organizational behavior. Emphasis is on intrapersonal behavior, such as motivation, job stress, and job satisfaction.

Prerequisite: *PSY 220.*

PSY 345

Training and Development (3,0)

3 Credits

A review of the principles and techniques applicable to training and training development.

Prerequisite: *PSY 220.*

PSY 350

Social Psychology (3,0)

3 Credits

This course examines the interactional forces between groups and the individual in society. Since the major focus of the course is on social interactions, such diverse topics as group dynamics, interpersonal relationships, prejudice, discrimination, and antisocial behavior will be considered. Special attention is given to the topic of stress in the aviation environment.

Prerequisite: *PSY 220.*

PSY 365

Abnormal Psychology (3,0)

3 Credits

This course is intended to familiarize students with the theory and research on the biological, cognitive-behavioral, and social-family perspectives and interventions of psychological disorders as problems that affect nearly everyone. Its emphasis on the research process, family issues, and the line between normal and abnormal behavior is intended to encourage students to think critically about social and personal issues, and to understand the strategies, methodologies, and the applicability of research in abnormal psychology.

Prerequisite: *PSY 350.*

PSY 400

Introduction to Cognitive Science (3,0)

3 Credits

An introduction to the science of the mind from the perspective of cognitive psychology, linguistics, neuroscience, philosophy, and artificial intelligence. The focus is on the similarities and differences in the approach taken by researchers in these different fields in their study of cognitive mechanisms. Issues to be addressed: What does it mean to be able to think? What kind of computational architecture(s) is most appropriate to describe cognitive mechanisms? Is the mind an emergent property of the brain? What kind of hardware is required for thinking to occur? Can a computer have a mind?

Prerequisite: *PSY 315.*

Regional Studies

RS 200

Modern Asia (3,0)
3 Credits

A survey course of the major political, economic, cultural, and historical changes in Asia since the 19th century. A regional and/or thematic focus may be created depending on the instructor's expertise. For example, an instructor may focus on East rather than South Asia, on history rather than economy.

Prerequisites: *HU 14X and sophomore standing or consent of instructor.*

RS 300

Observing Asian Cultures (3,0)
3 Credits

An interdisciplinary course that takes an anthropological, philosophical, and geographical approach to traveling in Asia. Topics include geographical changes in Asia, philosophical issues of travel, and the theory and methodology of studying other cultures and societies. The course culinates in an optional yet strongly recommended field trip to an Asian country.

Prerequisite: *sophomore standing or consent of the instructor.*

RS 305

Asian Literature (3,0)
3 Credits

Asian literature in translation. Representative readings are chosen from ancient times to the present, from poetry to prose, from female writers to male writers, from South to East Asia. Synthesis of major literary themes and development, as well as the cultural contexts for literature, is an important part of the course. The course uses both books and films as study material. A regional and/or thematic focus may be created depending on the instructor's expertise. For example, an instructor may focus on East rather than South Asia, on prose rather than drama.

Prerequisite: *Sophomore standing or consent of the instructor.*

Software Engineering

SE 300

Software Engineering Practices (3,3)
4 Credits

This course introduces students to the fundamental principles and methodologies of large-scale software development. Students learn about the theory and practice of software engineering and work as part of a team on a full life-cycle software project that includes planning, software specification, software design, coding, inspections, and testing. The course has a closed laboratory that includes activities that guide project teams through a software development process and support team project activities such as team building, planning, requirements analysis and specification, design, testing, and the use of tools.

Prerequisite: *CS 225.*

SE 310

Analysis and Design of Software Systems (3,0)
3 Credits

This course focuses on the fundamental methods employed in the analysis and design of software systems. Analysis is the process of determining a complete and consistent set of system requirements. Design is the process of producing a system architecture, both logical and physical, and determining an appropriate way to construct the software. The result of these processes is a documented model of the desired system. The student will learn and practice methods appropriate for both object-oriented and procedural systems.

Prerequisites: *CS 315, SE 300.*

SE 320

Software Construction (3,0)
3 Credits

This course provides the student with advanced instruction in programming with an object-oriented programming language. The course objective is proficiency in use of a language widely used for general purpose software development. In addition, the student will be introduced to tools and processes appropriate for employing this language in a significant software development environment. Students attending this course must already be proficient in the use of one major programming language and have knowledge of basic software engineering practices.

Prerequisites: *CS 315, SE 300.*

Course Descriptions

SE 410

Software Modeling (3,0)

3 Credits

This course focuses on the study of formal concepts and techniques used to model and analyze software artifacts (requirements, design, and code). The course includes a survey of mathematical modeling techniques used in software engineering. Course activities include reading, discussion, and exercises concerned with the use of formal mathematical models in software engineering (for example, work on a formal specification project, study of concepts and technology of formal model checking, use of a formal modeling tool, and presentations on articles about recent work in application and research in formal methods).

Prerequisites: *CS 222, SE 300.*

SE 420

Software Quality Assurance (3,0)

3 Credits

This course exposes the student to the key concepts and practices in software testing and quality assurance. The objective of this course is to introduce students to the concepts of Software Quality through testing, inspection, and walkthrough. The process of software testing and different testing techniques and methodologies will be covered. This course also covers topics related to the management of a testing project. Finally, different software testing tools and their advantages and disadvantages will be discussed.

Prerequisites: *SE 310 and SE 320.*

SE 450

Software Team Project I (2,3)

3 Credits

This is the first course in the sequence of a two-course senior project (SE 450 and SE 451). The senior project sequence of courses is the continuation of SE 300. They provide for additional student activities with the management, analysis, design, implementation, and testing of a software system. Students work in teams and use a defined software process to develop or modify a software product. Project work is assessed using industrial software standards and review techniques. The senior project sequence is considered the capstone course for undergraduate students in software engineering. The first course in this sequence (SE 450) emphasizes the early stages of the software development life cycle (requirements, analysis, and design). The artifacts developed during this course will be used as the foundation for further development during the second course in the sequence (SE 451).

Prerequisite: *senior standing, SE 310, SE 320.*

SE 451

Software Team Project II (1,6)

3 Credits

This is the second course in the senior project sequence (SE 450 and SE 451). This is the continuation of SE 450. This course provides for additional student activities with the management, analysis, design, implementation, and testing of a software system. Students work in teams and use a defined software process to develop or modify a software product. Project work is assessed using industrial software standards and review techniques. The senior project sequence is considered the capstone course for undergraduate students in software engineering. The second course in this sequence (SE 451) emphasizes the later stages of the software development life cycle (design, implementation, testing, and maintenance). The artifacts developed during the first course (SE 450) will be used as the foundation for further development during this course (SE 451).

Prerequisites: *SE 410 and SE 450. Corequisite: SE 420.*

SE 299, 399, 499

Special Topics in Software Engineering

1-6 Credits

Individual independent or directed studies of selected topics in software engineering.

Prerequisite: *consent of the instructor and the department chair.*

Safety Science

SF 201

Introduction to Health, Occupational, and Transportation Safety

3 Credits

This course introduces the student to the basic health and safety concepts associated with industry and transportation. Included are a comprehensive health and safety overview, a historical study of the legislative development and enactment of appropriate statutes, regulations, and laws, the definition of safety terms, and a discussion of the ethics and professionalism required by the health and safety profession. This course also provides an introduction to hazard recognition and reporting, evaluation, and control concepts used in risk management, accident investigation, ergonomics, and accident prevention management. This course involves three hours of lecture per week, with no laboratory or

Prerequisites *required.*

SF 210

Introduction to Aerospace Safety (3,0)
3 Credits

An introduction and overview of the theories, concepts, applications, and practices of the field of aerospace safety. The course is designed for the beginning aviation safety student and is a

Prerequisite *for most of the higher-level safety courses. Material presented covers the major specialty areas such as human factors, mechanical factors, accident investigation, safety programs, and safety statistics.*

SF 311

Industrial Security (3,0)
3 Credits

This course reviews the fundamentals of security and emergency planning and management. The nature, scope, and essential elements of security in the workplace are discussed with emphasis on personal protection and to a limited extent property protection. The workplace includes selected aviation and industrial settings. Students develop and/or evaluate security programs for selected industries.

SF 315

Environmental Compliance and Safety
3 Credits

This course examines matters associated with health and safety relating to the environment including air and water quality and sanitation. The course concentrates on hazardous materials, their storage, handling, and transportation by air, rail, marine, and highway. Additional study includes waste management and cleanup as well as a detailed study of environmental laws, regulations, and the protection of workers involved in activities associated with hazardous material activities.

SF 316

Workers' Compensation, Insurance, and Risk Management (3,0)
3 Credits

Loss control activities related to workers' compensation and injury prevention practiced by major insurance companies are studied. Concepts of measuring, evaluating, and ensuring safety and health hazard risks are addressed. Basics of workers' compensation are covered together with evaluating, quantifying, and managing risk due to safety and health hazards.

SF 320

Human Factors in Aviation Safety (3,0)
3 Credits

An examination of the major human causative agent in aircraft accidents: the human being. Emphasis is placed on the psychology and physiologic factors that enhance accident probability. Included is a detailed analysis of ergonomics (human engineering) and its influence.

SF 330

Aircraft Accident Investigation (3,0)
3 Credits

A detailed evaluation of methods and procedures involved in aircraft accident investigation. The organization, duties, and procedures of the Aircraft Accident Board are analyzed. The student explores procedures for determining accident causes through analysis for such elements as the function and techniques employed by the trained accident investigator and the role of the specialized laboratory. Analyses are also made of reporting procedures and the all-important followup work designed to avoid similar or related aircraft accidents.

Prerequisite: *SF 201 or SF 210 or approval. Recommended: AS 120 or AS 131 or knowledge at the private level.*

SF 335

Mechanical and Structural Factors in Aviation Safety (3.0)
3 Credits

Examination of design, manufacturing, metallurgy, and maintenance as to the influence each has on aircraft accidents. A detailed analysis of the failure process will be conducted. Additional topics include stress and design loading, fatigue, corrosion, and the envelope of operation.

Prerequisite: *SF 330. Recommended: AS 309.*

SF 345

Safety Program Management (3,0)
3 Credits

A study of the principles of the development and management of an effective safety program. The philosophy and historical development of major concepts are examined with particular emphasis on areas of special concern in organizational accident prevention. Students analyze the influence of morale, education, and training, the role of the supervisor, and other substantial program elements of value to the safety manager.

Prerequisite: *SF 201 or SF 210 or approval.*

Course Descriptions

SF 350

Aircraft Crash and Emergency Management (3,0)

3 Credits

Theory, practices, and techniques used in the response phase of aircraft crashes and emergencies. Designed as a real-world introduction to the field of emergency response at the CFR agency level, the airport response and administration levels, and related and associated entities involved in aircraft mishaps.

Prerequisite: *SF 201 or SF 210 or approval.*

SF 355

Industrial Hygiene and Toxicology (3,0)

3 Credits

This course examines principles associated with industrial hygiene. Topics include recognition, evaluation, and control of hazards related to noise, vibration, ionizing and nonionizing radiation, thermal conditions, pressure, chemicals, airborne contaminants, and biological substances. These subjects will be discussed in relation to all regulatory requirements using engineering and nonengineering controls for reducing or eliminating health hazards in the workplace.

Prerequisite: *SF 201 or approval.*

SF 365

Fire Protection (3,0)

3 Credits

This course introduces the basics of fire and fire protection. Students will study the physics, chemistry, characteristics, and behavior of fire, fire hazards of material, fire suppression systems, extinguishing agents, and detection and alarm systems. Primary emphasis will be on transportation-related fire hazards and the regulatory requirements associated with air, rail, marine, and highway modes of transportation.

SF 375

Propulsion Plant Investigation (3,0)

3 Credits

A technical course in aircraft reciprocating and turbine engine fundamentals and relevant accident investigative procedures. Areas of study include basic construction and design with emphasis on major sections, components, and their mechanical relationships. Power plant systems and system mishap investigation is also covered and includes fuel, lubrication, ignition, and start systems. A study of propeller basics and investigative techniques is also included. On-site field investigation as well as engine teardown/disassembly procedures are presented.

Prerequisite: *SF 330.*

SF 380

Internship I (3,0)

3 Credits

This internship is designed to give students hands-on experience in the field of safety, health, and the environment. Students apply concepts and theories learned in the program to real-world industrial settings. Students develop inspection and auditing procedures, conduct on-site measurements and evaluations of hazards, and formulate comprehensive reports detailing findings and recommendations.

Prerequisites: *SF 201, SF 315, SF 355, SF 410, or approval.*

SF 405

Applications in Industrial Hygiene (3,0)

3 Credits

This course advances and expands on the concepts discussed in SF 355 and emphasizes measurement and evaluation of workplace health hazards. Design and regulatory compliance of environments in the office settings and the manufacturing environments are addressed. Students develop and/or evaluate industrial hygiene programs for selected industries.

Prerequisite: *SF 355 or approval.*

SF 410

Design of Engineering Hazard Controls (3,0)

3 Credits

This course addresses the application of scientific and engineering principles and methods to achieve optimum safety and health through the analysis and design of processes, equipment, products, facilities, operations, and environments. Subjects will include product design, plant layout, construction maintenance, pressure vessels, and transportation vehicles and systems. These subjects will be discussed in relation to all regulatory requirements.

Prerequisite: *SF 201 or approval.*

SF 435

Aircraft Crash Survival Analysis and Design (3,0)

3 Credits

An in-depth analysis of the accident environment with particular emphasis on the protection of the occupants. The injury mechanisms and causes will be analyzed, as will the physics and kinematics of the impact sequence. The intent of the course is to familiarize the student with what can be done to minimize the effects of an accident.

Prerequisite: *SF 335 or approval.*

SF 440

Design of Engineering Hazard Controls II (3,0)

3 Credits

This course covers all relevant standards and regulations related to construction together with the development and implementation of construction safety programs. OSHA Standards 29 CFR 1926 and work methods design will serve as a basis for this course.

Prerequisite: *SF 201 or approval.*

SF 445

System Safety in Aviation (3,0)

3 Credits

This course entails specialized integration of skills and resources in all phases of the life cycle of a given system in furtherance of accident prevention. Its heritage is systems engineering and management theory but it is amplified to include modern safety practices derived from numerous disciplines. Accordingly, this course reviews the development and implementation of system safety technology in aviation, both civil and military. Students will acquire an understanding of how accident prevention is designed into an aircraft under development, evaluated and enhanced during flight test, and assured or otherwise controlled during operational use. This learning is juxtaposed with other elements of the total aviation system.

SF 450

Internship II (3,0)

3 Credits

This internship is designed to give students hands-on experience in the field of safety, health, and the environment. Students apply concepts and theories learned in the program to real-world industrial settings. Students develop inspection and auditing procedures, conduct on-site measurements and evaluations of hazards, and formulate comprehensive reports detailing findings and recommendations.

Prerequisite: *SF 380.*

SF 462

Health, Safety, and Aviation Law (3,0)

3 Credits

This course introduces the student to the legal issues and concerns confronting the health and safety industry. Included is an overview of the historical legal precedence established for the aviation industry, as well as a comprehensive examination of laws, regulations, and legislation that govern the actions and authority of the health and safety professional. This course also provides an introduction to the governing bodies and associations that are tasked with setting the legal standards by which the industry must operate, including the scope and level of their authority.

SF 299, 399, 499

Special Topics in Aviation Safety

1-3 Credits

Individual independent or directed studies of selected topics in aviation safety.

Prerequisites: *consent of instructor, approval of department and program chairs, and 12 hours of SF courses.*

Simulation

SIM 200

Aviation Simulation Systems (3,0)

3 Credits

This course emphasizes the importance of building a simulation system that delivers a flight experience that is realistic to the pilot. The student will develop a thorough understanding of the relationships between fidelity, FAA criteria for simulation approval, and pilot modal interaction with the simulation regarding senses including: proprioceptive, visual, tactile, and aural. Students will conduct an analysis of the need for motion and motion cueing to gain inferences on the associated affects on fidelity.

SIM 300

Flight Dynamics Algorithms

3 Credits

This course will derive the equations of motion of a 6 DOF aerospace vehicle. Stability derivative will be defined mathematically. The equations for static and dynamic stability of the longitudinal and lateral directional motion will be derived. Numerical integration methods in a suitable computer language will be used to solve these equations. Physical understanding of stability derivates will be discussed at length.

Prerequisite: *MA 345 or equivalent.*

SIM 400

Instrumentation for Flight Test (3,0)

3 Credits

Advanced instrumentation setups for aircraft flight testing. The following aircraft quality transducers will be discussed theoretically: accelerometers, rate gyros, strapdown gyro packages, digital pressure transducers, thermocouples, linear displacement transducers, load cells, and RPM transducers. Installation of the above instruments will be discussed. Calibration and

Course Descriptions

errors will be investigated. This course includes a lab for installation and calibration of transducers on an aircraft. Pre/corequisites: SIM 300 and MA 345.

SIM 402

Introduction to Flight Testing (3,0)
3 Credits

An overview of the role and function of flight testing in the aerospace industry. Major topics will include past, present, and future of flight test, FAA and DOD certification processes, risk management, test planning and reporting, and an overview of the principal flight test methods and procedures for aircraft and engine performance, stability and control, handling qualities, avionics systems performance and integration, human factors evaluation, production and maintenance flight test, homebuilt flight test, and DOD operational flight test. Final project will involve team evaluation of an aircraft using Embry-Riddle simulators, including test planning and reporting. Lab fee required.

Prerequisites: *AS 309 or equivalent and SIM 200.*

SIM 404

Fly-By-Wire Aircraft Simulation and Design (3,0)
3 Credits

This course addresses recent advances in automated flight control systems. Fly-by-wire aircraft architecture will be discussed. Aircraft simulations will be used to enhance and stabilize aircraft stability and handling qualities. Strategies such as theta control, c-star, and flight path angle control will be addressed.

Prerequisite: *SIM 300.*

SIM 406

Aviation Simulation Systems Integration (3,0)
3 Credits

This course addresses recent advances and new applications in the expanding field of telecommunications and computer networks and their relationship with computer-based simulations. Students learn the principles for creating a distributed interactive simulation (DIS) environment that realizes a common operational environment among the systems. The course addresses creation of a DIS environment that is coherent in time and space. Students learn aspects of networking necessary to create real-time seamless simulated flight environments. Topics include: ATM (asynchronous transfer mode), SONET/SDH (synchronous optical network/synchronous digital hierarchy), gigabit ethernet, 10 gigabit ethernet, OSI (open systems interconnection) reference model, TCP/IP (transmission control protocol/internet protocol) transmission media, network topologies, network protocols, and network performance.

Prerequisite: *IT 220 or equivalent.*

SIM 410

Flight Test and Simulation
3 Credits

An interdisciplinary, capstone course in flight-testing and simulation. This course will rely on interdisciplinary groups to perform flight tests and simulation matching for typical FAA certification of aircraft and simulators. Lab fee required.

Prerequisite: *SIM 300 or AS 340.*

Global Security and Intelligence Studies

SIS 100

Introduction to Global Security and Intelligence Studies (3,0)
3 Credits

SIS 100 is the introductory course for the Global Security and Intelligence Studies program. It discusses the whole range of contemporary international issues, from questions of realism versus idealism in foreign affairs, to changes in the nation-state, the implications of climate change, the proliferation of weapons of mass destruction, international development, the rise of China, and international public health. The course requires the student to closely follow breaking international developments and learn to discuss these objectively and analytically. An important emphasis throughout the course is for the student to learn and demonstrate critical thinking and imagination.

SIS 200

Introduction to the American Legal System (3,0)
3 Credits

This course will provide a general overview of the legal system in the United States. It is a core course for the GSIS program, designed to give the student a foundation in legal theory and philosophy, the sources of law, the place of the judicial system in the United States, the structure of the courts, original through appellate jurisdiction, judicial review, the role of the legal profession, the structure of civil and criminal cases, the adversarial process, constitutional law and protections, and the application of law to security and intelligence issues.

Prerequisite: *college-level history or permission of the instructor.*

SIS 312

Global Crime and International Justice Systems (3,0)
3 Credits

This course presents the current status and future trends in global crime and criminal justice systemic approaches to combating global crime. First, the course describes the rise of novel criminal activities in the context of globalization as well as the influence of globalization on pre-existing criminal activities. Second, the course describes globalization's effects on the structure, function, and process of criminal justice systems. Third, the course explores the reciprocal interactive and contextual relationships between global crime and criminal justice systems. The course emphasizes global, multicultural, and world historical perspectives of crime to professionally and personally prepare students for the challenge of 21st century life.

Prerequisites: *SS 204, SS 235, SS 310; and SIS 200 or permission of the instructor.*

SIS 315

Studies in Global Intelligence I (3,0)
3 Credits

This course will examine the uses of strategic intelligence by world leaders in shaping policy and the effects of strategic intelligence on world events. Issues to be covered include theoretical models of strategic intelligence; intelligence collection, evaluation, analysis, production, and dissemination; intelligence oversight; covert and clandestine operations; intelligence bureaucracies; ethical and moral issues in intelligence; counterintelligence. The course emphasizes strategic intelligence in the business, political, military, scientific, and technological domains.

Prerequisites: *junior standing or permission of the instructor.*

SIS 317

Political Change, Revolution, and War (3,0)
3 Credits

This course is designed to familiarize the intelligence professional with how major events and systemic changes occur in the international system through wars and revolutions. It also examines political changes that occur in a slower, more evolutionary way. In both cases, the approach is through a study of historical and contemporary examples. The signals that political systems give off as they approach major structural change are examined in some detail, as are the structures of revolutions and conventional and unconventional wars, including asymmetrical wars. Social and economic trends that shape more evolutionary political change are also studied. All forms of change in the international system are of importance to the intelligence analyst, who must warn the policy community of anticipated developments of importance to the government and, subsequently, explain the implications of what has occurred. The course will enable the student to understand predictive analysis and modeling and provide analytical tools with which to deal with changing events.

Prerequisites: *SS 110 and 235; SIS 315; or permission of the instructor.*

SIS 320

Topics in Global History, Politics, and Culture (3,0)
3 Credits

This course provides the student with an opportunity to focus more deeply on a region of the world, a particular culture or period in history, or a specific international problem. The topic covered by the course in a particular semester will vary according to student and program needs. The regions to be covered on an as-needed basis will include Europe, Latin America, the Middle East, Africa, and Asia. Alternatively, the course could focus on a topic such as Islam in the contemporary world, the weaponization of space, the implications of world migratory patterns, changing issues in international development, or the spread and implications of pandemics. Students may repeat the course in order to study another region or topical area.

Prerequisites: *SS 110 and 235; or permission of the instructor.*

SIS 323

Intelligence and Technology (3,0)
3 Credits

This course will examine the whole arena of intelligence and technology, beginning with the World War II period, when science and technology came to play a critical role in intelligence. The course will cover technical intelligence collection methodologies and systems, the use of aircraft and space-based vehicles as collection platforms for photo-optical and digital imagery, radar imaging, infrared and multi-spectral imagery, signals intelligence, etc. The course will provide a technical understanding of these methodologies, as well as an analysis of their place in all-source collection. The course will also examine the current development and implications of intelligence technologies, such as the emergent UAV systems.

Prerequisite: *SIS 315 or permission of the instructor.*

Course Descriptions

SIS 325

History of Terrorism (3,0)

3 Credits

This course will introduce the student to the history of terrorism, from the 19th century up to the present day. It will evaluate the causes of terrorism, the capabilities and limitations of terrorist groups, the requisites of effective counterterrorism responses, and the future prospects of terrorism. It will address the implications of terrorism and asymmetrical warfare for U.S. national security, including the possible use of weapons of mass destruction. The constitutional and legal implications of counterterrorist strategies will also be discussed. It will examine the organization, objectives, and methodologies of key terrorist groups operating in the 21st century, particularly those showing ideological hardening, religious revivalism, and ethnic militancy.

Prerequisites: *SS 110 and SS235.*

SIS 328

Intelligence Analysis, Writing, and Briefing (3,0)

3 Credits

This course is designed to strengthen the student's analytical and communications skills, preparatory to a career in intelligence and corporate security arenas. The course will enable the student to understand predictive analysis and modeling and will provide analytical tools with which to deal with changing events. Included among the latter are computer-based analytical programs currently used intensively in the intelligence community, as well as familiarity with intelligence and warning matrices and link analysis. The student also is trained to write intelligence briefs and required to practice this style and format under short deadlines. The student also will write a longer intelligence assessment and then brief that to the class.

SIS 400

International Security and Globalization (3,0)

3 Credits

An analysis of 21st-century international security issues related to scientific and technological change. Topics include the nature of security-economic, sociocultural, and military; political leadership/followership, decision making, and conflict resolution; political violence, especially terrorism and ethnic conflict; intelligence and counterintelligence analysis and operations; weapons proliferation; information warfare; the politics of international organized crime; bureaucratic evil; internal dislocation and immigration; and the politics of public health. A special focus throughout the course will be on the aviation and aerospace industries: policies and operations, safety, and security. This course will emphasize science, technology, and globalization as the environment in which concepts of international security evolve and as impacted by international security phenomena.

Prerequisites: *college-level psychology and college-level history or permission of instructor.*

SIS 405

Environment and Security (3,0)

3 Credits

This course is designed to introduce students to the contingencies and conflicts posed by the intersection of security and environmental issues, including disputes over ground water rights, international rivers, scarce energy resources, manipulation of crop gene pools, genetically modified crops, global migration, international treaties and conventions on environmental issues, and global climate change. Students will be introduced to environmental issues that pose significant security risks to a nation, affect a nation's economic wellbeing and/or military preparedness, and pose challenges to those laws governing the protection of the natural environment. Ethical issues will also be addressed, particularly as these relate to policy making on issues that span both environmental and security concerns.

Prerequisite: *SIS 315 or permission of the instructor.*

SIS 410

Business Security and Competitive Intelligence (3,0)

3 Credits

This course will focus on the security requirements of corporations, both in the domestic and international arenas. Among the topics addressed are personnel security, due diligence in hiring, physical security and access controls, government classification systems and requirements, political and security risk analysis, and corporate crisis and emergency planning and management. Included in the international sphere will be stakeholder analysis; the implications of cultural factors, legal systems, and international criminal threats; emergency extraction methodologies and actors; and kidnap and rescue. In addition, the course will develop approaches to competitive intelligence. This is the use of methods in the legal domain and using open source information to seek out and analyze the strategic plans of one's competitors, of their intended actions and investments, methods of operation, and corporate financial position.

Prerequisites: *SIS 312 and 315; or permission of the instructor.*

SIS 415

Studies in Global Intelligence II (3,0)
3 Credits

This course provides an intensive, semester-long simulation for teams of students assuming the roles of political, military, economic, or scientific and technological intelligence case officers. Through the semester-long immersion with an intelligence tasking, students will be expected to demonstrate sophistication with case officer-agent relationships; staffing and coordination involving the various combinations in one's intelligence station, among stations, and between one's station and regional and central headquarters; intelligence briefings, executive summaries, and estimates; credibility and risk analysis, both of sources and of recommendations concerning specific covert action, espionage, and counterintelligence operations; operations/physical/communications/personnel securities; and the intelligence opportunities, limitations, and threats presented by today's era of globalization.

Prerequisite: *SIS 315 or permission of the instructor.*

SIS 420

Aviation Security and Technology (3,0)
3 Credits

This course will concentrate on the disciplines of security and intelligence as applied to aviation. Students will learn to apply the four core security disciplines: communications security, operations security, physical security, and personnel security. Of prime concern in this course is airport/aviation readiness to prevent and respond to the following threats: hijackings, CBRN attacks, bombings, missiles, and shootings as perpetrated by terrorists and/or various nonpolitical hijackers. Other topics include airport familiarization and safety; post 9/11 responses by the public, industry, and the government; airport hardening; security screening; first responder roles and needs; the off-airport interface and multimodal infrastructure; cargo and general aviation issues; international security; biometrics and other emerging technologies; and airline security issues.

Prerequisites: *SIS 312 and SIS 315; or permission of the instructor.*

SIS 422

Homeland Security and Technology (3,0)
3 Credits

This course will examine the whole range of issues relevant to the defense and security of the U.S. homeland. These will include transportation security, immigration and border security, cargo security, the presence of radical elements in the United States, the statutory and regulatory structure, and the institutions and agencies responsible for homeland security at the federal, state, and local levels. Legal and ethical issues also will be examined, as these relate to national security and privacy.

Prerequisite: *SIS 315 or permission of the instructor.*

SIS 425

Personnel Security (3,0)
3 Credits

This course will focus on how one minimizes violations of trust in the professional world. It does this through a detailed analysis of the selection, orientation, management, training, resignation, termination, and retirement of personnel in security, intelligence, business, and government organizations. The scope of this course embraces relevant material from the behavioral and social sciences, philosophy, history, computer science, engineering disciplines, and personnel security case histories. Of special relevance are the constructs of personality, morals and ethics, deception, genetic epistemology, corruption, coercion, profiling, and private and public self-consciousness.

Prerequisite: *SIS 315 or permission of the instructor.*

SIS 199, 299, 399, 499

Special Topics in Global Security and Intelligence Studies
1-3 Credits

Individual independent or directed studies of selected topics in Global Security and Intelligence Studies related topics.

Prerequisites: *Consent of instructor and approval of department or program chair. May be repeated with a change of subject.*

Space Studies

SP 110

Introduction to Space Flight (3,0)
3 Credits

A survey of the major aspects of space flight. Topics covered include the history of space flight, space shuttle operations, and present and future commercial, industrial, and military applications in space.

SP 200

Planetary and Space Exploration (3,0)
3 Credits

This is a survey course of U.S. and international space programs. The student will be introduced to the Earth

Course Descriptions

and its space environment, to methods of scientific exploration, and to spacecraft and payload criteria at the introductory physics level.

SP 210

Space Transportation System (3,0)
3 Credits
A survey course of the space transportation system (STS) at the introductory physics level. Included are manned space flight operations, supporting systems, and the space shuttle mission, both present and future. A review of space shuttle flight profiles, guidance and navigation control, proximity operations and rendezvous, and a brief review of hypersonic orbiter aerodynamics are included. Also covered are future STS applications to space station logistical operations, commercial applications, and Department of Defense operations.

SP 215

Space Station Systems and Operations (3,0)
3 Credits
This course is designed to provide a brief study of the space station flight operations, its supporting elements, and planned systems. The survey study will include commercial applications, logistical support, and maintenance and servicing design concepts at the introductory level.

SP 220

Life Support Systems (3,0)
3 Credits
This course is a survey at the elementary physics level of the requirements and design considerations for life support systems in space and on other planets. Included are an introduction to basic human physiology, a description of the space environment and a survey of historical life support systems, and a presentation of spacecraft limitations and requirements.

Prerequisite: *PS 102 or PS 103.*

SP 300

Satellite and Spacecraft Systems (3,0)
3 Credits
Orbital satellites and spacecraft are discussed according to their application, design, and environment. The power system, shielding, and communication systems are reviewed along with their missions, space environment, and limitations.

Prerequisite: *MA 112 or equivalent.*

SP 400

Introduction to Space Navigation (3,0)
3 Credits
This course will introduce the student to basic elements of space navigation at the introductory physics level. The consequences of Newton's law of gravitation and central force motion, including Kepler's three laws of planetary motion, are explained. The physical characteristics of the solar system and the Earth/Moon system are reviewed. The basic methods and techniques of navigating in near-Earth orbit and the Moon and planets are described.

Prerequisites: *MA 112 and PS 103 or equivalent.*

SP 425

Selected Topics in Space and Aerospace (3,0)
3 Credits
This course introduces students to problems in space operations, space flight, or other space-related topics that can be critically addressed from a knowledge base of elementary calculus, elementary physics, and the subject matter of any two space studies courses. The specific topics will be selected by the course monitor and instructor and published in the Schedule of Courses in the preceding semester. This is a required course for the Space Studies minor.

Prerequisites: *PS 104 and any two SP courses or equivalent.*

SP 299, 399, 499

Special Topics in Space Studies
1-3 Credits
Individual independent or directed studies of selected topics in space studies related topics.

Prerequisites: *consent of instructor and approval of department or program chair. May be repeated with a change of subject.*

Social Sciences

SS 110

World History (3,0)
3 Credits
Designed primarily as a survey of the development and evolution of Western civilization from 1500 to the present. Emphasis is placed on the effect of Western influence on the world.

SS 120

American History (3,0)
3 Credits

From 1865 to the present. Reconstruction, the age of big business, the U.S. as a world power. World War I, World War II, the Great Depression and its aftermath.

SS 130

History of Aviation in America (3,0)
3 Credits

A survey of the history of America in the 20th century, emphasizing the explosive growth of aviation as a major influence on the economic, military, and societal development of the United States.

SS 204

Introduction to Geography (3,0)
3 Credits

A survey course designed to acquaint the student with types of maps, map reading and use, as well as to show relationships between geography and economics, culture, and geopolitics. Humans and their use of their environment are stressed, along with the usual emphasis on places, names, and locations. Ancillary topics will include climate, demography, and transportation.

SS 210

Introduction to Sociology (3,0)
3 Credits

Integrated survey of the fundamental concepts of culture, forms of collective behavior, community and social organization, social interaction, and social change. The social effects of aviation and the impact of science on the social order living in an air age will also be investigated.

SS 302

Evolution of Scientific Thought (3,0)
3 Credits

Traces the development of science from the earliest times through the modern period, with particular emphasis given to our changing concepts of nature and of science itself. (Also offered as PS 302. Students receive either Social Sciences elective credit or Physical Sciences elective credit, but not both.)

Prerequisites: *Any course from the HU 140 series and either PS 101 or PS 102 or PS 103 or PS 150 and PS 215.*

SS 310

Personality Development (3,0)
3 Credits

A survey of selected theories of human nature and functioning from the beginnings of modern psychology to present developments, including psychodynamic, cognitive, behavioral, biological, humanistic, and other types. Various concepts of personality and the associated methodologies for gathering and validating knowledge are explored. Theories are applied to normal issues in personal, professional, and relational life, and theory-related skills are taught for self-awareness, problem-solving, habit change, and emotional and interpersonal competence.

SS 311

U.S. Military History 1775-1900 (3,0)
3 Credits

Military history with emphasis on military policy, organization and technology as they relate to U.S. political, social, and economic developments from 1775 to 1900.

SS 320

American National Government (3,0)
3 Credits

Basic issues of American democracy, constitutional principles, and the executive, legislative, and judicial branches of government.

Prerequisite: *college-level history or permission from the instructor.*

SS 321

U.S. Military History 1900-Present (3,0)
3 Credits

Military history with emphasis on military policy, organization, and technology as they relate to U.S. political, social, and economic developments from 1900 to the present.

SS 325

International Studies (3,0)
3 Credits

An overview of the land, the people, the culture, and the history of one region of the world, with emphasis on current events and policies on the world scene. Specific content varies from year to year.

Prerequisite: *college-level history or permission from the instructor.*

Course Descriptions

SS 326

Russian-American Relations (3,0)
3 Credits

This course explores the development of Russian-American economic and political relations, emphasizing the era of the 20th century.

Prerequisite: *college-level history or permission from the instructor.*

SS 331

Current Issues in America (3,0)
3 Credits

A course in selected political-economic issues of national and international importance. Extensive use of journals, magazines, and newspapers to supplement lectures and discussions.

Prerequisite: *college-level history or permission from the instructor.*

SS 332

Gender, Ethnicity, and Class in 19th and 20th Century Global History (3,0)
3 Credits

The social and cultural conceptualization of gender, ethnicity, and class, and their significance and role in global history during the 19th and 20th centuries.

SS 333

U.S.-Asian Relations (3,0)
3 Credits

This course explores the development of U.S.-Asian political, cultural, and economic relations, from their beginnings in the 19th century to the present. The course will examine America's domestic motivations for expanding into the Pacific, the various impacts that the United States has had on Asian nations, and Asia's collaboration with and resistance to the American presence.

Prerequisite: *lower developmental history course or junior standing.*

SS 334

Contemporary Africa and the World (3,0)
3 Credits

A historical examination of Africa's land, societies, and cultures with a focus on the political and economic changes and challenges that have marked the continent's relations with major world powers during and after the Cold War.

Prerequisite: *college-level history or permission from professor.*

SS 336

The Modern Middle East in World Affairs (3,0)
3 Credits

A historical examination of the land, societies, cultures, economics, and politics of the Middle East from World War I to the present in relation to recent and current world events and policies.

Prerequisite: *college-level history or permission from professor.*

SS 340

American Foreign Policy (3,0)
3 Credits

A survey of the evolution of present American foreign policy, stressing the factors that affect and shape this policy. Attention is given to current governmental offices, agencies, and departments and the role each plays in policy formulation. Emphasis is on the period since World War II.

Prerequisite: *college-level history or permission from the instructor.*

SS 350

Psychology of Relationships (3,0)
3 Credits

Empirical, theoretical, and practical knowledge of the components of intimate relationships, involving friendship, romance, marriage, divorce, and non-traditional relationships, and embedded in lifespan development. Disciplines include social, behavioral, clinical, family, and biological psychology, as well as sociology, anthropology, sociobiology and neuroscience. Consideration of how relationship knowledge is gathered and interpreted, along with the social and political consequences of such knowledge for relationship descriptions, prescriptions, and power. Development of self-awareness and interpersonal skills through writing, experiential exercised, improvisational drama and communication games.

SS 351

Relationship Skills Laboratory (0,3)
1 Credit

This laboratory provides small group practice of principles taught in SS 350, Psychology of Relationships. Methods of practice include individual mental, emotional, and imaginal awareness techniques, pair-interactional exercises interspersed with individual writing and reflection, role playing, and group discussion. Co/prerequisite: Open to students who are taking or have completed SS 350.

SS 360

Environmental Law (3,0)

3 Credits

Provides a general introduction to the field of planning, and examines the procedural approaches shared by practitioners working in all areas of contemporary planning. Introduces legal concepts and doctrines relevant to pollution control, assessment of environmental impacts, and land use.

Prerequisite: *PS 142 or permission of instructor.*

SS 361

Labor and Technology (3,0)

3 Credits

This course examines the relationship between labor and technology from historical and cultural perspectives. This examination ranges from the industrial revolutions of the 18th and 19th centuries to the present with extrapolations into the future of industry, labor, and society. Particular emphasis will be placed on analyzing the change from mass production (fordism) to flexible production (post fordism), and the relationship between the mobility of labor and capital with the globalization of technology. This course will look at case studies from aviation/aerospace telecommunication, and automobile industries in the United States, Pacific Rim, European Community, and Latin America.

Prerequisite: *college-level history or permission from the instructor.*

SS 363

Inter-American Relations (3,0)

3 Credits

This course explores the development of U.S. political and economic relations with Latin America from their beginnings in the 19th century to the present.

Prerequisite: *SS 110 or SS 120 or SS 130 or junior standing.*

SS 299, 399, 499

Special Topics in the Social Sciences

1-6 Credits

Individual independent or directed study of selected topics in the areas of history, sociology, psychology, and human culture in general.

Prerequisites: *consent of instructor and approval of the department chair.*

Science, Technology, and Globalization

STG 205

Global Economics (3,0)

3 Credits

The purpose of this introductory course is to present the theory of comparative advantage and understand protectionism, distinctions in developed compared to developing countries, and trade policy. Regional and global trade agreements as well as multinational enterprises will be studied.

STG 210

Global Problem Solving (3,0)

3 Credits

A practical introduction to problem solving by learning to assess, develop, and contribute one's expertise to the solution of problems that organizations face in a global environment. Emphasis is given to problem recognition, definition, and solution. Various types of nonmathematical problem-solving strategies are explored, such as consulting, strategic planning and management, organizational change, conflict resolution, and facilitation. Concepts presented are applicable to all fields, such as aviation, engineering, computer science, environmental studies, security, and technology policy and management.

Prerequisite: *PSY 220 or SS 120 or permission from instructor.*

STG 305

Global Policy Studies (3,0)

3 Credits

A crossnational survey and analysis of the processes of policy making for science and technology, environment, and security. Emphasis on how local, national, international, and global policy making are related in these three areas of global change.

Prerequisites: *two Social Sciences courses and one History course or permission of instructor.*

STG 318

Science and Religion (3,0)

3 Credits

This course explores the relationship between science and religion through an examination of essays and segments of texts in the areas of modern science and modern theology with an eye toward understanding the basic assumptions, the new theories and models, and the language of both. Such understanding will then allow for an informed debate as to whether

Course Descriptions

these two fields must stand in inevitable conflict or whether they can move in the direction of coexistence, dialogue, or even integration.

Prerequisite: *junior standing.*

STG 325

Engineering Cultures (3,0)

3 Credits

This course seeks to improve students' abilities to understand and assess engineering practices and knowledge from humanistic and global perspectives. This course encourages students to step back, critically assess, and intervene in technological problems that they encounter (and will encounter) as future engineers or colleagues of engineers. The course compares the cultures of engineering at different times and places and explores how forms of engineering have contributed to everyday cultural life.

Prerequisite: *SS 210 or SS 220 or permission from instructor.*

STG 330

Environmental Consulting (3,0)

3 Credits

Today's industries, including the aviation industry, are under the umbrella of federal and state regulations dealing with a variety of environmental issues. One aspect of these regulations is an EA (Environmental Assessment), which is part of the NEPA (National Environmental Protection Act) regulations. This process will be examined and used to analyze local and regional projects.

STG 401

Environment and Culture (3,0)

3 Credits

This course provides an overview of the various ways nature has been used in historical and cultural contexts. It will examine Christian, Native American, Scandinavian, and Eastern imagery of the earth as well as scientific writings on nature. In addition, the course will examine the relationship between what is considered natural and social policy. The course will also examine the politics of environmental and economic policies. At least one significant piece of nature writing (fiction or nonfiction) will be included each time the course is offered.

Prerequisites: *HU 143 and PS 142 or permission of instructor.*

STG 402

Global Technosciences (3,0)

3 Credits

This course provides an in-depth analysis of globalization of production, dissemination, transfer, and practice of science and technology. Social and cultural theories of globalization will be applied to emerging transnational infrastructures (for example, Internet, NASA hypersonic flight project, International Space Station, Human Genome Project) and to transnational scientists and engineers (for example, European Ingenieur, corporate research scientists and engineers).

Prerequisite: *college-level sociology or college-level international studies or permission of instructor.*

STG 405

Consulting Field Casework (3,0)

3 Credits

Teams of students–generally in advanced stages of their program of study–are assigned to work with selected business organizations. The team's purpose is to provide the client organization with consulting advice in the areas of strategic management, organizational design, human resource use, and operations productivity. Work takes place both in the classroom and at the client's work location. This course will equip students to contribute their education and expertise in situations where they must rely on influence, rather than managerial control, to impact an organization. Their ability to recognize and define problems and present workable solutions as members of interdisciplinary teams will be developed as they respond to various case situations. Their written/oral presentations and teamwork skills will be raised to professional standards. This course takes students beyond textbooks and case studies in the real world. Students will be challenged to define and help solve complex problems in a changing environment. They will work with clients who are real people with a personal investment in the project and a show-me attitude. Success is measured by the students' ability to find workable solutions to the client's real or perceived problems, and get them implemented. Unlike a co-op, students do not take direction from nor have a direct reporting relationship with the client company. Their direct report is the instructor of the class, who acts as overall project manager. The student teams' relationship with the company or organization is consultant-client.

Prerequisites: *BA 201, BA 311, BA 332, STG 210, and BA 436 or permission from instructor.*

STG 406

Environmental Management (3,0)

3 Credits

This course focuses on the development of an environmental management plan. Today much of the environmental work in corporations, including the aviation industry, is carried out in projects. The management of these projects starts with the development of proposals, funding sources, tasks, and timeline. Employees at a variety of levels are required to help manage projects, so terms and organizational contents will be covered.

Systems Engineering

SYS 301

Introduction to Systems Engineering (3,0)

3 Credits

Provides an overview of systems engineering in the development of large systems, including genesis and need, characteristics of systems and system engineers, the system life cycle (from birth to death), design for operational feasibility, project management, structure, and system control, statistical/probabilistic models in dealing with risk inherent in large, complex systems. Emphasis on the importance of system requirements regarding total system performance, interfaces, cost, schedule, optimization, and trades.

Prerequisites *MA 243.*

SYS 302 System Engineering

Design Considerations (3,0)

3 Credits

This course examines the considerations in developing systems that meet specified system performance requirements while also achieving necessary levels of reliability, maintainability, and supportability consistent with the operational requirements. In addition, consideration is given to issues associated with producibility and disposability. Mathematical methods associated with reliability, maintainability, and supportability are discussed and applied. Liberal use of examples is incorporated to illustrate the interactions and relationships of these metrics, and how they are used to measure and trade off among these elements. The intent is to sensitize the systems engineer to the need for technical, schedule, and cost trade-offs to achieve desired yet safe and affordable system performance.

Prerequisite: *SYS 301.*

SYS 303

Optimization in Systems Engineering (3,0)

3 Credits

This course emphasizes that the optimization of some subsystems may be detrimental to others and hence to overall system performance or cost. Topics include traditional optimization methods, such as classical parameter optimization linear programming, dynamic programming, numerical methods (for example, perturbation and gradient techniques), and genetic algorithms. In addition, techniques such as Pareto or multi-objective optimization are examined with the aim of achieving a sufficient balance among subsystem performance and cost, ultimately to obtain an overall optimal system.

Prerequisite: *SYS 301.*

SYS 304

Systems Engineering in Management, Risk, and Decision Making (3,0)

3 Credits

An understanding of the decision-making process usually requires simplification of the complexity facing the systems engineer and associated decision-making. This course examines methods such as modeling and simulation (M&S) for identifying/generating alternatives, evaluating their outcomes in terms of risk and benefit, and ultimately providing management authority with options and recommendations on such alternatives to support effective decision-making. Topics include both technical and economic evaluation models and methods. The course also emphasizes the importance of program controls (for example, PERT) and system configuration control.

Prerequisites: *SYS 301, EC 225.*

SYS 403

Systems Engineering Life Cycle Costing (3,0)

3 Credits

Current trends in system development indicate that, in general, complexity is increasing, and many systems in use today are not meeting the needs of customers. These trends, combined with past practices, have tended to create an imbalance between cost and effectiveness. This course addresses this important aspect of systems engineering by examining cost and economic factors under the general theme of design for affordability. An introduction to life-cycle costing is followed by a focus on costs as they occur throughout the system life cycle. Types of contracts (for example, fixed price, cost-plus) are studied. The steps

Course Descriptions

in the life-cycle cost analysis process are examined through the use of examples, and the applications and benefits of life-cycle costing are summarized.

Prerequisite: *SYS 304.*

SYS 405

Aerospace Systems Guidance and Control (3,0)
3 Credits

Provides a second, advanced course in control systems, with emphasis on the multidimensional state-space approach. Application of digital control systems in aerospace instrumentation, sensors, guidance, and navigation. Addresses optimal control systems, including multi-objective control, and introduction to advanced methods such as fuzzy systems control, neural networks, and genetic algorithms.

Prerequisite: *EE 401 or equivalent control systems course.*

SYS 410

Space Systems and Mission Analysis (3,0)
3 Credits

This course provides an arena for applying many of the important techniques in systems engineering through the development of a deep space exploration mission, from mission definition through system concept and design. Considerations will be given to all aspects of mission development and operations including spacecraft design, communications, navigation, payload data handling, personnel, and cost. Students will be assigned to discipline teams, working together in a systems engineering context to produce project documents (concept of operations, project plans, schedules, budgets, mission operations plans, and system design documents).

Prerequisite: *SYS 403 or permission of the instructor.*

SYS 417

Senior Systems Engineering Project (3,0)
3 Credits

This is the capstone course for the systems engineering track. The project will involve setting system characteristics, specifications, interfaces, and so on, and planning and scheduling the design process. Complete analysis is required from performance, costs, and reliability. Although an electrical component is dominant, other disciplines such as software, mechanical, and fluid will be involved. The course requires the completion of a detailed project document package.

Prerequisite: *SYS 403 or permission of the instructor.*

College Success

UNIV 101

College Success (2,0)
1 Credit

A course in which students assess and develop the personal, interpersonal, intellectual, and social skills necessary to succeed in college. Time management, study skills, goal clarification, career information, and college resources are included. This course is available to freshmen only.

UNIV 102

Self-Assessment and Portfolio Preparation (2,0)
1 Credit

This course is required of all adult undergraduate students seeking an assessment of their prior experiential learning by portfolio. Students will assess their prior learning experiences in light of career and educational goals. The distance learning course is designed to assist students in life and career planning, goal clarification, career concerns, portfolio preparation, and the development of college success skills. The focus is on methods of self-assessment of prior learning work/education/training experiences and procedures for assembling a portfolio to document learning experiences. This course is graded Satisfactory/Unsatisfactory and is required for students who seek prior learning portfolio evaluation. Students must register for UNIV 102 within six months of course registration.

UNIV 400

Career Development (1,0)
1 Credit

Introduces students to various elements involved in obtaining a position in their chosen fields. Topics included are self-assessment, research and selection of a career path, sources of jobs, job-search techniques, resumes and letters of application, references, interviewing skills, business etiquette, and professional image. Each student will develop a career portfolio including personal and professional information related to career goals.

Applied Meteorology

WX 201

Meteorology I (3,0)
3 Credits

A survey course in atmospheric science that includes applications to flight. Included is a systematic development of the following: thermal patterns, atmospheric moisture, horizontal and vertical pressure patterns, clouds, atmospheric circulation, local winds, stability, air masses, fronts, fog, icing, thunderstorms, jet streams, and turbulence. Students will study and make use of surface weather observations, surface maps, and constant pressure maps.

Prerequisite: *MA 006 or equivalent.*

WX 202

Current Weather Discussion (1,0)
1 Credit

This course takes advantage of real-time weather data to introduce, review, and apply various topics that are developed in other courses within our program. Two, three, and four-dimensional analysis techniques are used to examine the evolution of previous, current, and forecast weather conditions. Subject matter will vary from semester to semester. The course is repeatable for a total of three credits.

Prerequisite: *WX 201.*

WX 205

Reading the Clouds (1,0)
1 Credit

This course focuses on visually identifying clouds and cloud formations to interpret their underlying meteorological meaning. Formations associated with wind shear, turbulence, stable and unstable atmospheres, and severe weather will be discussed.

Prerequisite: *WX 201.*

WX 210

Introduction to Geographic Information Systems (3,0)
3 Credits

Geographic Information Systems (GIS) encompass all aspects of spatial data analysis from data acquisition and manipulation through problem solving to the graphic presentation of results. This course surveys GIS theory and applications as students learn to store, retrieve, manipulate, analyze, and display spatial data according to a variety of user-defined specifications. Lectures will emphasize fundamental principles of GIS while computer-based exercises will emphasize training.

WX 211

Introduction to Weather Observations (1,0)
1 Credit

This course provides an in-depth examination of the currently used aviation routine weather report (METAR). Various methodologies of modern measurement techniques, including the use of remote sensing, are examined in detail. The impacts of converting from a human-based observation system to an automated, machine-based system are presented and discussed. In-situ measurements will be taken and field measurement sites that provide observational support to the aviation/aerospace industry will be visited.

Prerequisite: *WX 201.*

WX 215

Weathering and Landforms (3,0)
3 Credits

Students will acquire a thorough comprehension of various physical and chemical forces that sculpt the landscape. From alluvial fans and distinct dune formations of the arid and semi-arid west to the karst terrain of the humid east, these features reveal a rich history of climatological conditions. A greater understanding of weathering processes and the resultant landforms should lead to a heightened appreciation of geophysical properties and products. No

Prerequisites *are required.*

WX 261

Applied Climatology (3,0)
3 Credits

An in-depth survey of the varied climates of the world, the weather systems that contribute in the aggregate to those climates, and their cumulative influence on aircraft system performance and the National Air Space over very small to global space and time scales. Included is a historical perspective on how our climate is changing and the atmospheric processes involved in the global change process. Emphasis is placed on developing a broad-based working knowledge of the impacts of present-day climate and its variability on aviation-related practices, procedures, and operations.

Prerequisite: *WX 201.*

Course Descriptions

WX 270

Weather Information Systems (3,0)

3 Credits

An introduction to the various states of weather sensing equipment modernization and the systems that deliver weather information to various users. The development of various sensing devices are explored and the current technology explained.

Prerequisite: *WX 201.*

WX 310

Advanced Geographic Information Systems

3 Credits

Advanced GIS is designed to further develop the concepts and principles learned in WX 210, Introduction to GIS. Lectures will focus on current theories and technology trends in geographic information sciences integrating theoretical knowledge with hands-on technical training in the computer classroom. Weekly discussion of the latest developments in GIS will reinforce these experiences while fostering an appreciation of GIS as an effective analytical tool for understanding complex processes. The course culminates in a class project involving scholarly research by teams of students based on GIS applications.

Prerequisite: *WX 210.*

WX 320

Atmospheric Thermodynamics (3,0)

3 Credits

This course provides an application of physics and calculus to the study of atmospheric thermodynamics. The course covers such topics as hydrostatics, conservation of energy, the Ideal Gas Law, temperature relationship to kinetic energy, specific heats, enthalpy, and entropy. Additionally, water and its transformations, the thermodynamics of dry, moist, and saturated air, and thermodynamic diagrams are covered.

Prerequisites: *PS 208, (PS 104 or PS 160), WX 353, MA 242.*

WX 352

Meteorology II (3,0)

3 Credits

An expansion of Meteorology I, including the following theoretical concepts: hydrostatic instability, baroclinic instability, thermal wind, and kinematic fields. These will be integrated into real-time weather analysis of synoptic patterns involving mid-latitude cyclones, advection, frontal systems, and jet streams. Practical application will be achieved through presentation of current and historical weather data emphasizing common hazards to aviation such as thunderstorms, strong winds, fog, icing, and turbulence. An introduction to weather forecasting concepts will be presented.

Prerequisite: *WX 201.*

WX 353

Advanced Meteorology I (3,0)

3 Credits

A course for those requiring an in-depth understanding of the physical processes governing the atmosphere. Includes discussion and quantitative treatment of meteorological conventions, atmospheric state and structure, radiation, heat/energy transfer, boundary layer structure and fluxes, moisture, stability, cloud formation, and precipitation.

Prerequisites: *PS 104 (or PS 208, or PS 160), WX 352.*

WX 354

Advanced Meteorology II (3,0)

3 Credits

A course for those requiring an in-depth understanding of the dynamic processes governing the atmosphere. Includes discussion and quantitative treatment of atmospheric forces, the equations of motion, local and global winds, air masses and fronts, middle latitude cyclones, quasi-geostrophic theory, thunderstorms, and hurricanes.

Prerequisites: *PS 104 (or PS 208, or PS 160), WX 353.*

WX 355

Weather Analysis (5,0)

5 Credits

This course presents conceptual models of synoptic weather features and applies them to analysis of meteorological data fields. Meteorological codes for surface and upper air data are surveyed and the basic conventions of surface and upper air charts are introduced. Labs cover the standard tools of weather analysis and give students practice constructing and using isopleths of pressure, temperature, dew point, and geopotential height. The horizontal and vertical structure of fronts is examined through pattern recognition of standard meteorological variables, atmospheric thickness, and cross-section analyses. Methods for analyzing wind fields, such as streamlines, air parcel trajectories, and jet stream identification, are presented. Students practice conceptually integrating satellite and radar data to verify and refine their analyses in accordance with dynamical principles. This course covers both manual (hand-drawn) weather map techniques and computer meteorological analysis software packages.

Prerequisite: *WX 353. Corequisite: WX 354.*

WX 363

Thunderstorms (3,0)

3 Credits

This course provides tools for analyzing and forecasting thunderstorms and their associated hazards. Key characteristics of the thunderstorm and its environment are explored using both case studies and real-time weather data. Students examine atmospheric soundings to determine the likelihood of storm development and the amount of energy available for thunderstorms. Vertical wind shear is analyzed for clues about storm organization and severity. Other information, such as weather charts, computer models, satellite imagery, and Doppler radar imagery, is used to observe the characteristics of thunderstorms and the weather patterns that favor them. Students gain a basic scientific understanding of thunderstorm behavior as well as practical experience observing and predicting them.

Prerequisite: *WX 352.*

WX 364

Weather for Aircrews (3,0)

3 Credits

Making use of the Weather Center and the Internet, students collect and study weather data from around the world. Emphasis is placed on decoding information contained in the remarks section of weather observations and on the differences between North American weather charts and those produced in other parts of the world. Students investigate the flying conditions and aviation environment over the seven continents. The proper operation of airborne weather radar is studied. Students identify weather hazards by using ground-based weather radar and satellite imagery. At the Daytona Beach campus, this is the capstone course for the Aviation Weather Minor.

Prerequisite: *WX 352.*

WX 365

Satellite and Radar Weather Interpretation (3,0)

3 Credits

A practical introduction to meteorological interpretation of satellite and weather radar imagery. This course surveys the basic physics of electromagnetic (EM) radiation and shows how characteristics of the EM spectrum are exploited in passive (satellite) and active (radar) remote sensing to create digital images of geophysical information. The theory of radar signal propagation and precipitation estimation is applied to the meteorological interpretation of radar imagery and supplemented with practical analysis of various radar product types. Weather satellite image types, including visible, conventional infrared, and water vapor channels and their meteorological applications, are examined. Real-time satellite identification of meteorological phenomena will be emphasized, including mountain waves, midlatitude cyclones, fronts, jet streams, troughs, ridges, vorticity, cloud types, fog, precipitation, ordinary and severe thunderstorms, tropical waves, and hurricanes. Surface and upper-air weather maps will be used to enhance the students' understanding of satellite image signatures.

Prerequisite: *WX 352.*

WX 370

Planetary Atmospheres (3,0)

3 Credits

The knowledge of mechanisms and forces that cause the Earth's atmosphere to move will be applied to the other planets. Solar effects on space travel will be studied. Emphasis will be placed on the weather of the planets that will most likely be visited in the early 21st century. Students will present a project that examines the solar and atmospheric effects of travel to their favorite planet. This course can be used to satisfy a requirement in the Minor in Space Studies.

Prerequisite: *WX 352.*

WX 390

Atmospheric Physics (3,0)

3 Credits

Topics covered include elements of Earth-Sun geometry, radiative transfer, photochemistry, and remote sensing of the atmosphere. Additionally, properties of aerosols and clouds, cloud nucleation, precipitation processes, and atmospheric electricity will be discussed.

Prerequisites: *MA 242, WX 353.*

WX 401

Meteorology of Aircraft Mishaps (3,0)

3 Credits

WX 401 investigates the role weather plays in the chain of causality of an aircraft mishap, paying special attention to the acquisition and application of atmospheric witness-data obtained from conventional and/or remote-sensor sources. The limitations and accuracy envelope of both human observers and automated meteorological systems (AWOS/ASOS) are explored and developed. The weather types that are a part of the accident chain of causality are examined in detail relative to specific case histories as recorded in selected National Transportation Safety Board (NTSB) reports.

Prerequisite: *WX 352.*

Course Descriptions

WX 427

Forecasting Techniques (3,0)
3 Credits

This course provides an introduction to the world of weather prognostication. Topics include the traditional forecast methods based on weather analysis techniques, up through the latest computer-generated weather prediction models. The student is exposed to techniques for forecasting tomorrow's weather as well as seasonal weather trends.

Prerequisite: *WX 353, WX 354, WX 355, WX 363, and WX 365. Corequisite: WX 202.*

WX 429

Severe Weather Seminar (2,0)
2 Credits

Investigations into recent severe weather outbreaks. Students will collect and analyze data using the latest techniques to document and explain large-scale convective systems. Radar and satellite data are assessed and case studies are published.

Prerequisite: *WX 363.*

WX 457

Weather Operations Seminar (3,0)
3 Credits

This course simulates a number of industry/agency operational weather environments. The student will acquire and evaluate the significance weather impact variables have on all phases of the operational environment. Real-time as well as preprogrammed scenarios are used to provide the student the opportunity to become knowledgeable in the methodologies employed by decision-makers in flight and marine planning/operations, multimedia productions, and agribusiness operations.

Prerequisite: *WX 355.*

WX 490

Dynamic Meteorology I (3,0)
3 Credits

This first course in atmospheric dynamics uses physics and calculus. The instruction includes such topics as equation of motion on a rotating Earth, balanced flow, kinematics, circulation theorem, conservation of absolute angular momentum, mass continuity, vorticity equation, and wind-pressure imbalance.

Prerequisites: *MA 243, WX 354, and WX 320.*

WX 491

Dynamic Meteorology II (3,0)
3 Credits

This is the second course in atmospheric dynamics, which uses vectors. It includes such topics as Rossby waves, quasi-geostrophic theory, and synoptic-scale instability theory.

Prerequisite: *WX 490.*

WX 299, 399, 499

Special Topics in Meteorology
1-6 Credits

Individual independent or directed studies of selected topics in applied meteorology.

Prerequisites: *consent of instructor and approval of the program coordinator.*

Extended Campus

SOURCES OF ADDITIONAL INFORMATION

Extended Campus students should contact their Center Cirector or Distance Learning Enrollment Office, or any of the offices listed below for more information and guidance:

General Information
Telephone: (386) 226-6910
or (800) 522-6787
Email:ecinfo@erau.edu

OFFICE OF STUDENT SERVICES

Extended Campus
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900

Admissions: (866) 509-0743
Email: ecssc@erau.edu

Registrar: (866) 393-9046
Email: ecregist@erau.edu

Portfolio Assessment: (877) 362-7970
Fax: (386) 226-6984

Disability Support Services
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600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
Telephone: (386) 226-7917
Fax: (386)-226-6082

Career Services
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
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Telephone: (386) 226-6054
Email: eccareer@erau.edu

CENTER FOR PROFESSIONAL EDUCATION

Extended Campus
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
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Telephone: (386) 323-8669
Fax: (386) 323-8692
Toll free: 1-866-574-9125

FINANCIAL SERVICES

Financial Aid Office
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
Telephone: (386) 226-6300
-or- (800) 943-6279

Veterans Education Benefits:
University Veterans' Affairs Office
Embry-Riddle Aeronautical University
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
Telephone: (386) 226-6350

Student Financial Services
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DISTANCE LEARNING ENROLLMENT OFFICE

Extended Campus
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Worldwide: (386) 226-6397
Fax: (386) 226-7627

Extended Campus

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
EXTENDED CAMPUS CENTER LISTING BY STATE / COUNTRY

ALABAMA		
FORT RUCKER	Enterprise	(334) 598-6232
Teaching Sites:		
Mobile Teaching Site (out of Pensacola)		(251) 441-6737
HUNTSVILLE	Huntsville	(256) 876-9763
ALASKA		
ANCHORAGE	Anchorage	(907) 753-9367
FAIRBANKS	Fairbanks	(907) 356-7773
Teaching Site: Eielson AFB		(907) 377-2977
ARIZONA		
LUKE	Glendale	(623) 935-4000
Classroom Locations:		
Glendale Municipal Airport		
Lockheed-Martin Goodyear (MSTM ONLY)		
SKY HARBOR	Phoenix	(602) 275-5533
TUCSON	Tucson	(520) 747-5540
WILLIAMS GATEWAY	Mesa	(480) 279-1150
ARKANSAS		
LITTLE ROCK	N. Little Rock	(501) 983-9300
CALIFORNIA		
BEALE	Marysville	(530) 788-0900
Classroom Location: McClellan AFB		
CAMP PENDLETON	Oceanside	(760) 385-4423
CHINA LAKE	Ridgecrest	(760) 939-4557
EDWARDS	Rosamond	(661) 258-1264
FORT IRWIN	Fort Irwin	(760) 386-7997
Classroom Location : MCLB Barstow		
INLAND EMPIRE	Riverside	(951) 653-4074
Classroom Location: Riverside Airport		
LEMOORE	Lemoore	(559) 998-6026
LONG BEACH	Los Angeles (Metro Center)	(562) 627-5870
NORTH ISLAND	San Diego	(619) 435-1293
OAKLAND	Oakland	(510) 636-2424
Classroom Locations: Hayward, Livermore, Oakland, and San Carlos Airports		
PALMDALE	Palmdale	(661) 947-4025
SAN DIEGO	San Diego	(858) 576-4375

TRAVIS	Fairfield	(707) 437-5464
VANDENBERG	Lompoc	(805) 734-4076
Classroom Location: Lompoc		
VENTURA	Point Mugu	(805) 271-9691
COLORADO		
COLORADO SPRINGS	Ft. Carson	(719) 526-3387
FLORIDA		
FT. LAUDERDALE	Pompano Beach	(954) 497-3774
Classroom Locations:		
Palm Beach Lakes H.S.		
Signature Flight Support, FLL/HWY International Airport		
U.S. Coast Guard Air Station, Opa Locka		
Pratt & Whitney, West Palm Beach		
FORT WALTON BEACH	Fort Walton Beach	(850) 678-3137
HURLBURT FIELD		(850) 581-2106
JACKSONVILLE	Jacksonville	(904) 779-0246
Teaching Site: Mayport		(904) 249-6700
Classroom Locations:		
Craig Airfield	Jacksonville	
Northrop Grumman	St. Augustine	
Jacksonville Int'l Airport	Jacksonville	
MIAMI	Miami	(305) 871-3855
Teaching Site: Key West		(305) 871-3855
ORLANDO Metro	Orlando	(407) 352-7575
PENSACOLA	Pensacola	(850) 458-1098
Teaching Sites:		
NAS Whiting Field	Milton	(850) 623-7787
US Coast Guard ATC		
Mobile (see Alabama)	ALABAMA	
SPACE COAST	Cocoa	(321) 783-5020
MSTM Teaching Site: Barry University	Merrit Island MSTM ONLY	
Classroom Locations:		
Vero Beach		
Sarno		
United Space Alliance	Kennedy Space Center	
Brevard County Adult Ed. Center	Titusville	
TAMPA	Tampa	(813) 828-3772
Teaching Site: St. Petersburg College		(727) 394-6218
Classroom Location: Tampa Coast Guard Air Station		
TYNDALL	Panama City	(850) 283-4557
Teaching Site: Tallahassee		

Extended Campus

GEORGIA		
ATLANTA METRO	Marietta	(770) 426-9990
Teaching Site: Delta Airlines		(404) 714-3248
Classroom Location: Virginia Crossings		
MOODY	Moody AFB	(229) 244-9400
ROBINS	Warner Robins	(478) 926-1727
Teaching Site: Columbus, Georgia	Fort Benning Pratt & Whitney	(706) 685-0105
SAVANNAH	Savannah	(912) 355-0644
Classroom Location: Fort Stewart		
HAWAII		
HONOLULU	Honolulu, Oahu Island	(808) 422-0835
Classroom Location: Honolulu Airport Site		
KANEOHE	Kailua, Oahu Island	(808) 254-2106
SCHOFIELD BARRACKS	Mililani	(808) 624-2334
Classroom Location: Coast Guard Air Station	Barbers Point	
IDAHO		
MOUNTAIN HOME	Mountain Home	(208) 832-2222
INDIANA		
INDIANAPOLIS	Indianapolis	(317) 487-6281
KANSAS		
MCCONNELL	Wichita	(316) 687-3006
KENTUCKY		
FORT CAMPBELL	Clarksville	(270) 798-2775
LOUISVILLE	Louisville	(502) 964-9204
LOUISIANA		
BARKSDALE	Shreveport	(318) 747-4508
MAINE		
BRUNSWICK	Brunswick	(207) 721-0664
MARYLAND		
ANDREWS	Andrews	(301) 735-6340
PATUXENT RIVER	Lexington Park	(301) 863-8776
MINNESOTA		
MINNEAPOLIS	Eagan	(651) 905-9595

Extended Campus

MISSISSIPPI		
KEESLER	Biloxi	(228) 432-5312
MONTANA		
GREAT FALLS	Great Falls	(406) 727-9901
Classroom Location: Helena		(406) 439-9060
NEBRASKA		
OFFUTT	Omaha	(402) 292-6655
NEVADA		
FALLON	Fallon	(775) 423-4018
Classroom Locations: Hawthorne, Reno ANG		
LAS VEGAS	Las Vegas	(702) 643-0762
NEW JERSEY		
MCGUIRE	Trenton	(609) 723-1337
NEW MEXICO		
ALBUQUERQUE	Albuquerque	(505) 846-8946
CANNON	Clovis	(505) 784-8763
HOLLOMAN	Alamagordo	(505) 479-6892
NORTH CAROLINA		
ELIZABETH CITY	Elizabeth City	N/A
FORT BRAGG	Fayetteville	(910) 436-5005
POPE	Fayetteville	(910) 436-3188
SEYMOUR JOHNSON	Goldsboro	(919) 734-9211
NORTH DAKOTA		
GRAND FORKS	Grand Forks	(701) 594-5324
MINOT	Minot	(701) 727-9007
OHIO		
CINCINNATI	Cincinnati	(513) 733-3728
Teaching Site: Cincinnati-Kentucky Airport		
DAYTON AREA	Fairborn	(937) 878-3728
Teaching Site: Wright-Patterson		(937) 254-3728

Extended Campus

OKLAHOMA		
ALTUS	Altus	(580) 481-5991
OKLAHOMA CITY	Oklahoma City	(405) 739-0397
VANCE	Enid	(580) 213-7320
OREGON		
PORTLAND		(503) 288-8690
SOUTH CAROLINA		
CHARLESTON	Charleston	(843) 767-8912
MCAS BEAUFORT	Beaufort	(843) 228-7585
SHAW	Sumter	(803) 666-7401
Teaching Site: McEntire Air National Guard Base		
TENNESSEE		
MEMPHIS	Memphis Airport	(901) 507-9969
TEXAS		
CORPUS CHRISTI	Corpus Christi	(361) 937-4951
DYESS	Abilene	(325) 692-2007
FORT WORTH	Dallas/Fort Worth	(817) 737-8180
MSTM Teaching Site: Lockheed-Martin		
HOUSTON	Houston	(281) 244-9456
SAN ANTONIO	San Antonio	(210) 659-0801
SHEPPARD		(940) 851-6458
UTAH		
NORTHERN UTAH	Ogden	(801) 777-0952
Classroom Locations:		
Ogden Airport	(AMT ONLY)	
Clearfield Town Square		
VIRGINIA		
FORT EUSTIS	Newport News	(757) 887-0980
LANGLEY	Hampton	(757) 764-2662
NORFOLK	Norfolk	(757) 440-5078
Teaching Site: Oceana		(757) 437-8061
WASHINGTON		
EVERETT	Everett	(425) 514-0220
SEATTLE	Seattle	(426) 226-2484
SPOKANE	Spokane	(509) 244-3832
TACOMA	Tacoma	(253) 589-1728
WHIDBEY ISLAND	Oak Harbor	(360) 279-0959

WYOMING

CHEYENNE	Cheyenne	(307) 634-9693
Classroom Location:		
Aims Community College	Greeley, CO	

WORLDWIDE CAMPUS CENTER (EUROPE-CIVILIAN)

UNITED ARAB EMIRATES

ABU DHABI	Abu Dhabi	011-971-24451514
DUBAI	Dubai	011-971-43260333

EUROPEAN CENTERS LIST BY COUNTRY

ENGLAND

RAF LAKENHEATH	Lakenheath	011-44-1638-522464
Teaching Site: Keflavik	Iceland	011-354-425-4772
RAF MILDENHALL	Mildenhall	011-44-1638-542916
Teaching Site: Lajes Field	Portugal	011-351-295-57-3375

GERMANY

GIEBELSTADT AAF	Giebelstadt	011-49-9334-87-7578
Teaching Site: Camp Bondsteel	Kosovo	011-49-621-730-781-4684
HANAU AAF	Hanau	011-49-6181-9540337
Classroom Location: Wiesbaden AAF Wiesbaden		
KATTERBACH AAF	Katterbach	011-49-9802-8757
Classroom Location: Illesheim		
RAMSTEIN AB	Ramstein	011-49-6371-44204
SPANGDAHLEM AB	Spangdahlem	011-49-6565-7297
Teaching Site: Geilenkirchen		

ITALY

AVIANO AB	Aviano	011-39-0434-66-0631
Teaching Site: Vicenza	Italy	011-39-0444-717570
SIGONELLA	Italy	011-39-095-56-4550
Teaching Site: Naples	Italy	011-39-081-568-4364

SPAIN

ROTA	Rota	011-34-956-822984

TURKEY

INCIRLIK		
Teaching Site: Down Range Class Division		011-90-322-316-1098

LUXEMBOURG

LUXEMBOURG	Luxembourg	011-352-42-59-91314

Faculty and Administration

the administration and faculty of Embry-Riddle are listed below. Where applicable, the numeral one (1) denotes the Daytona Beach Campus; the numeral two (2) denotes the Prescott Campus; the numeral (3) denotes the Extended Campus. All others are assigned to the University administration.

Legend

Letter designations for aviation qualifications are as follows:

A – Airplane
C – Commercial Pilot
G – Glider
H – Helicopter
I – Instrument
L – Land
P – Private Pilot
S – Seaplane
AD – Aircraft Dispatcher
IA – Inspection Authorization
ME – Multi-Engine
SE – Single-Engine
A&P – Airframe and Powerplant Maintenance Technician
AGI – Advanced Ground Instructor
ATP – Airline Transport Pilot
BGI – Basic Ground Instructor
CFI – Certified Flight Instructor
CTO – Control Tower Operations
DME – Designated Mechanic Examiner
DWE – Designated Written Examiner
HTA – Heavier Than Air
IGI – Instrument Ground Instructor
LTA – Lighter Than Air
SME – Single- and Multi-Engine
FCC – Federal Communication Commission
FE – Flight Engineer
AC – Advanced Graduate Credit

Officials of the University

JOHNSON, JOHN P.
Interim President and Provost; Professor, College of Arts and Sciences.
B.A. and M.S., Florida State University; Ph.D., Kent State University.

CARRELL, DANIEL L. [2]
Chancellor, Prescott Campus. B.A., Northwestern State University; M.A.S., Embry-Riddle Aeronautical University; C-H.

CONNOLLY, THOMAS J.[1]
Chancellor, Daytona Beach Campus; Endowed Chair in Aviation; Professor of Aeronautical Science. Ed.D., Nova University; ATP-MEL; CE-500; C-SEL; CFI-ASMEL & IA; AGI; IGI.

JOST, ROBERT A.
Vice President - Chief Business Officer. B.B.A. and M.B.A., Stetson University.

METZNER, JOHN
Vice President, External Relations. B.A. and M.A., Midwestern State University.

RAMSEY, PAT
Interim Vice President of Development. B.S., University of Tennessee.

SMITH, MARTIN[3]
Chancellor, Extended Campus. B.A., University of Massachusetts; M.B.A., Western New England College.

STACKPOOLE, KENNETH
Vice President of Government Relation. B.S. and M.A.S., Embry-Riddle Aeronautical University; Ph.D., University of Central Florida; ATP, CFI-AI-ME.

WEEKES, ERIC
Vice President - Chief Financial Officer. B.S., New York Institute of Technology; M.B.A., New York University.

Faculty and Administration

Academic Administration

Abramowitz, Jeffrey D., Major, U.S. Army
Professor of Military Science, Army ROTC, Prescott Campus. B.A., Beaver College; M.A., Rutgers University; J.D., Rutgers University School of Law.

Ayers, Francis H. Jr.
Associate Professor of Aeronautical Science and Chair, Flight Department, Daytona Beach Campus. B.A., Virginia Polytechnic Institute and State University; M.S., Embry-Riddle Aeronautical University.

Barbie, Donna J.
Professor of Humanities and Communications; Chair, Department of Humanities and Social Sciences, Daytona Beach Campus. B.S., Mary University; M.A., North Dakota State University; Ph.D., Emory University.

Bergeron, Keith
Associate Professor of Mathematics and Chair, Department of Mathematics and Computer Science, Prescott Campus. B.S., U.S. Air Force Academy; M.S. and Ph.D., University of New Mexico.

Bloom, Richard
Professor of Psychology, Social Thought, and Global Security/ Intelligence Studies; Dean, College of Arts and Sciences, Prescott Campus. B.A., Columbia University; M.A., New School for Social Research; Ph.D., Kent State University.

Brady, Tim
Professor of Safety Science; Dean of the College of Aviation, Daytona Beach Campus. B.S.,Troy State University; M.S., Abilene Christian University; Ph.D., St. Louis University; ATP-MEL; C-SEL.

Brown, James M.
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Dickey, Archie
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Friend, Mark A.
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Gally, Thomas A.
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Grant, Christopher D.
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Greene, Frances
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Hampton, Steve
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Helfrick, Albert
Professor of Engineering Technology and Chair, Departments of Electrical and Systems Engineering and Mechanical, Civil, and Engineering Sciences, Daytona Beach Campus. B.S., Upsala College; M.S., New Jersey Institute of Technology; Registered Professional Engineer; FCC Radiotelphone Operators License, Radar Endorsement.

Hickey, Michael P.
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Jenkins, John
Professor of Mathematics; Associate Dean for Academic Support, Prescott Campus. B.A., University of Tennessee; M.A.T., University of Florida.

Jeralds, Sean
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Faculty and Administration

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Lessard, Dennis
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Luedtke, Jacqueline
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McElwain, Patric
Assistant Professor and Chair, Department of Humanities and Communications, Prescott Campus. B.A., Bryan College; M.A., Edinboro State University; Ph.D., Indiana University of Pennsylvania.

Moore, Alan R., Captain, U.S. Navy
Professor of Naval Science, Navy ROTC, Daytona Beach Campus. B.S., University of Kansas; M.A., Naval War College.

Nordstrom, Brian H.
Professor of Chemistry and Associate Dean, College of Arts and Sciences, Prescott Campus. B.A. and M.S., University of California, Berkeley; Ed.D., Northern Arizona University.

Northam, Gary
Professor and Chair, Department of Safety Science, Prescott Campus. B.A. and M.Th., Harding University; Ph.D., the University of Nebraska.

Olivero, John J.
Professor of Physics and Chair, Department of Physical Sciences, Daytona Beach Campus. B.S., Florida State University; M.S., College of William and Mary; Ph.D., University of Michigan.

Parker, Nancy E.
Professor of Humanities and Communications, University Director of Diversity Advancement. B.A., Hollins College; M.A., Johns Hopkins University; Ed.D., University of Central Florida.

Petree, Daniel L.
Professor of Management; Dean of the College of Business, Daytona Beach Campus. B.S.B.A. and M.B.A., Rockhurst College; Ph.D., University of Kansas School of Business.

Piercey, Rodney B.
Professor of Physics; Dean of the College of Arts and Sciences, Daytona Beach Campus. B.A., Center College of Kentucky; Ph.D., Vanderbilt University.

Rabern, Donald
Professor of Aerospace Engineering; Dean of the College of Engineering, Prescott Campus. B.S., University of Utah; M.S. and Ph.D., University of Arizona.

Rehback, Randy
University Director of Flight Operations. B.S. and M.A.S., Embry-Riddle Aeronautical University; A&P; ATP; CE-500; CFI.

Rhoades, Dawna L.
Professor of Strategy and Chair, Department of Management, Marketing, Strategy, and Operations, Daytona Beach Campus. B.A., University of Alabama, Huntsville; M.P.A., University of Washington; Ph.D., University of Houston.

Richey, Franklin D.
Professor of Aeronautical Science, Associate Dean, College of Aviation, Daytona Beach Campus. D.B.A., Nova Southeastern University; ATP-ASMEL; AGI; IGI.

Roach, Richard D.
Assistant Provost for Institutional Effectiveness. B.A., University of Houston; M.Div. and D.Min., Southwestern Baptist theological Seminary.

Sajjadi, Shahrdad
Professor and Chair, Mathematics Department, Daytona Beach Campus. B.Sc. and Ph.D., Coventry University.

Schaefer, Michael P., Major, U.S. Army
Professor of Military Science, Army ROTC, Daytona Beach Campus. B.S., Texas Tech University; M.S., Central Michigan University; M.M.A.S., Air University.

Schrader, Thomas J., Colonel, U.S. Air Force
Professor of Aerospace Studies, Air Force ROTC, Daytona Beach Campus. B.A., University of Southern Mississippi; M.S., Golden Gate University; Command Pilot.

Shehi, Karen B.
Dean, Worldwide Center Operations, College of Career Education, Extended Campus. B.S., Kansas State University; M.S.A., Central Michigan University; Ed.D., Nova Southeastern University.

Sieland, Thomas E.
Dean, College of Career Education, Dean of Academics, Extended Campus. B.S., Florida State University; M.S., University of Michigan; Ph.D., Texas A&M University.

Sinclair, Mark R.
Associate Professor and Chair of Meteorology, Prescott Campus. B.S., Otago University, New Zealand; Ph.D., Naval Postgraduate School.

Smith, Darrel W.
Professor of Physics; Chair, Department of Physics, Prescott Campus. B.A., M.A., and Ph.D., University of California, Irvine.

Towhidnejad, Massood
Professor of Computing and Chair, Department of Computer and Software Engineering, Daytona Beach Campus. B.S.E., M.S., and Ph.D., University of Central Florida.

Waterhouse, Shirley
Director of Educational Technology. B.S., University of Georgia; M.S., University of Central Florida; Ed.D., Nova Southeastern University.

Watret, John Robert
Associate Professor of Mathematics; Associate Provost. B.Sc., Heriot-Watt University; M.S. and Ph.D., Texas A&M University; P-ASEL.

Williams, Michael J.
Professor of Management and Chair, Department of Economics, Finance, Accounting, Risk Management, and Information Systems, Daytona Beach Campus. B.S. and M.A.M., Embry-Riddle Aeronautical University; Ph.D., Nova Southeastern University; A&P; DME.

Faculty and Administration

Daytona Beach Campus Faculty

College of Arts and Sciences

Abreu, Rafael E., Lieutenant, U.S. Navy
Assistant Professor of Naval Science, Navy ROTC. B.S., Embry-Riddle Aeronautical University.

Aggarwal, Shiv Kumar
Professor of Physics. B.Sc., M.Sc., and M.A., Panjab University; M.S., University of North Carolina; M.S. and Ph.D., Ohio University.

Azeem, Irfan
Assistant Professor of Engineering Physics. M.S., University of Michigan.

Badran, Stacie
Assistant Professor of Mathematics. B.S., M.S., and Ph.D., Florida State University.

Ballard, Jonathan L., Captain, U.S. Army
Assistant Professor of Military Science, Army ROTC. B.S., Western Kentucky University.

Berhane, Bereket H.
Assistant Professor of Physics. M.S. and Ph.D., Georgia Institute of Technology.

Bishop, Charles W.
Assistant Professor of Physics. B.S., Stockton State University; M.S., University of Central Florida.

Blanton, Gabriel C., Lieutenant, U.S. Navy
Assistant Professor of Naval Science, Navy ROTC. B.S., Embry-Riddle Aeronautical University.

Blickensderfer, Elizabeth L.
Associate Professor of Human Factors and Systems. B.S., University of Nebraska, Kearney; M.S. and Ph.D., University of Central Florida.

Boener, Henry B., Commander, U.S. Navy
Associate Professor of Naval Science, Navy ROTC. B.S., United States Naval Academy; M.A., Naval Postgraduate School.

Bogart, Jesse B., Captain, U.S. Air Force
Assistant Professor of Aerospace Studies, Air Force ROTC. B.A., U.S. Air Force Academy; M.S., Embry-Riddle Aeronautical University.

Boquet, Albert J.
Associate Professor of Human Factors and Systems. B.A., Nicholls State University; M.A. and Ph.D., University of Southern Mississippi.

Brown, Norman M.
Associate Professor of Humanities, Social Sciences, and Psychology. B.A. University of California, Berkeley; M.A., Middlebury College; M.A., Sonoma State University; Ph.D., Stanford University.

Brown, Robert S. Jr.
Professor of Physics. B.S. and M.S., Lowell Technological University; Ph.D., University of Connecticut.

Camara, Mohamed S.
Assistant Professor of Social Sciences. Ph.D., Northwestern University.

Cameron, David L.
Associate Professor of Chemistry. B.A., University of Colorado; Ph.D., Colorado State University.

Carney, Jennifer
Instructor of Humanities. B.A., Flagler College; M.A., Stetson University.

Chivington, Kevin D., Captain, U.S. Air Force
Assistant Professor of Aerospace Studies, Air Force ROTC. B.A., Miami University; M.B.A., Touro University.

Clark, Brett M., Major, U.S. Army
Assistant Professor of Military Science, Army ROTC. B.S. and M.A.S., Embry-Riddle Aeronautical University; Senior Army Aviator; CI-AMEL; CI-HMEL.

Collins, Jan S.
Associate Professor of Mathematics. B.S., Embry-Riddle Aeronautical University; M.A., University of Central Florida; P-ASEL.

Craft, Stephen
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